

## A REVISION OF THE NEARCTIC BERIDINAE (DIPTERA: STRATIOMYIDAE)

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**ABSTRACT.** The Beridinae (Diptera: Stratiomyidae) from the Nearctic Region are taxonomically revised. Nine species in four genera are recognized. Keys to all taxa, diagnoses for genera and species, and descriptions of each species are presented. Male and female genitalia are illustrated for the first time, and maps of distributions are included.

*Beris strobli* Dušek and Rozkošný, *Beris fuscipes* Meigen, and *Exodontha dubia* (Zetterstedt) are found to occur in the Nearctic Region, and are thus Holarctic.

The generic name *Exodontha* Rondani is resurrected from synonymy with *Antissa* Walker, and is used for the Holarctic species of the "Antissini." *Hemiberis* Enderlein is removed from synonymy with *Actina* Meigen, and placed in synonymy with *Beris* Latreille.

*Beris annulifera* var. *luteipes* Johnson is resurrected from synonymy with *Beris annulifera* (Bigot), and raised to specific status. *Beris californica* James, a junior name, is synonymized with *Beris luteipes* Johnson. *Allognosta similis* (Loew) is synonymized with *Allognosta obscuriventris* (Loew). *Beris annulifera* (Bigot) is synonymized with *Beris fuscipes* Meigen. *Exodontha grandis* (James) is synonymized with *Exodontha dubia* (Zetterstedt).

Neotypes are designated for *Beris fuscitarsis* Say and *Sargus dorsalis* Say, the latter a synonym of *Allognosta fuscitarsis* (Say). Lectotypes are designated for *Beris quadridentata* Walker, *Metoponia similis* Loew, and *Oplacantha annulifera* Bigot.

Biological notes are presented for each species based on information in the literature and on specimen labels.

### INTRODUCTION

The subfamily Beridinae is a group of primitive Stratiomyidae, as evidenced by

their seven undifferentiated abdominal segments, a character shared by the other subfamily considered primitive, the Chironomyzinae. The only species of the latter subfamily in the Nearctic Region is the introduced *Inopus rubriceps* (Macquart), which occurs in the San Francisco Bay area of California. This species is easily recognized by its vestigial mouthparts and its antennal flagellum which lacks distinct annuli. The other subfamilies of Stratiomyidae in North America have an abdomen composed of five principal segments, the sixth and seventh being telescoped within the abdomen. Thus the Beridinae may be easily recognized in the Nearctic Region. The key to genera presented by Cole (1969) will also enable the reader to identify these flies readily at the generic level.

Melander (1904) provided the first synopsis of the Nearctic Beridinae. Curran (1927) improved upon this in his treatment of the Canadian Stratiomyidae, incorporating new species that had been described after Melander's paper. James (1939) again reviewed the subfamily for the Nearctic Region, and his paper established the classification that has been only slightly modified until now. McFadden (1972) synonymized several varieties described by Johnson (1926a, 1926b) with their nominate species, and reduced *Beris canadensis* (Cresson) to synonymy with *Beris annulifera* (Bigot).

Workers on the Palaearctic fauna, notably Rozkošný and his colleagues (Du-

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šek and Rozkošný, 1963; Rozkošný, 1973; Nartshuk and Rozkošný, 1975, 1976) and Nagatomi and Tanaka (1969, 1972), were the first to utilize male genitalia extensively to stabilize species concepts. A number of names were synonymized, and it became easier to compare the Nearctic fauna with the Palaearctic fauna. Subsequently, I examined the genitalia of the Nearctic species of Beridinae for the first time, which has resulted in one synonymy of a Nearctic species with a Palaearctic one, the discovery of two Palaearctic species previously unrecorded from the Nearctic Region, and new synonymies within the Nearctic fauna. In addition, I have examined nearly all types of North American Beridinae (of the types in existence for names used in North America, *Beris fuscipes* Meigen is the only name for which I have not seen a type). This paper reports the results of my study.

Nine species of Beridinae in four genera are now known to occur in North America, three of which are Holarctic. At present it is not possible to discuss evolutionary relationships between the genera that inhabit the Nearctic Region; this must await a worldwide study of generic concepts within the subfamily. The Beridinae are most diverse in southern South America, Australia, and New Zealand, and they remain poorly known in the latter two regions.

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## METHODS

Over 4000 specimens have been examined in the course of this work. The genitalia of all known species were examined and illustrated with the aid of an ocular grid in a Leitz binocular dissecting microscope. After being cleared with hot 10% KOH, and neutralized with weak acetic acid followed by a water rinse, the parts were stored in plastic microvials and attached to the pin of the appropriate specimen.

Measurements were made with an ocular micrometer. The frontal width was measured at the anterior ocellus and divided by the width of the head taken at

the same point to arrive at the ratio provided in the description. Lengths of the entire insects were measured from the anterior-most portion of the head to the tip of the abdomen, but do not include the antennae.

Collection data have been summarized, and do not include precise localities for the United States localities except for species that are uncommon or rare. Common species are summarized by county only. Since females of the genus *Exodontha* Rondani are difficult to identify with certainty, the sexes of specimens from each locality are indicated, to give the reader an idea of which localities are best documented.

Stippling indicates internal surfaces of sclerotized structures in all drawings except Figures 48 and 53, where it indicates membrane. In some other figures of the male post-genital segments, areas around the cerci are more or less membranous, however, though the stippling is meant to indicate the internal surface of the eleventh sternum.

## TAXONOMIC CHARACTERS

Most of the taxonomic characters utilized in this study are unambiguous. It seems advisable to comment briefly on the terms used for the male and female genitalia, however, as a variety of terms have been used for the same structures, even within the literature of the Stratiomyidae.

The female genitalia have been found to exhibit useful characters at the specific level, especially the so-called genital furca. This structure evidently represents the highly modified ninth abdominal sternite (Bonhag, 1951), contrary to the statement by Nagatomi and Iwata (1976) that the ninth sternite is absent in most lower Brachycera. In the Beridinae the furca is fused to the ninth tergite. The spermathecal ducts pass through the median aperture of the furca into the genital chamber. In most cases the posterior por-

tions of the ducts are unsclerotized and thus nearly invisible in cleared preparations of the female genitalia. In *Beris fuscipes* Meigen and *B. luteipes* Johnson, however, in which the posterior portions of the ducts are sclerotized, they may be followed all the way to the aperture, which in both species is quite small. The median portions of the ducts are unsclerotized and rather long, leading to the sclerotized anterior portions of the ducts and the spermathecae, which are also sclerotized. The spermathecae are very similar in all species of Beridinae examined, and are three in number. The illustrations of the female genitalia present a ventral view. They are most valuable as specific level characters in *Beris*. Even though they are distinctive for other species, except in the genus *Exodontha*, they are not necessary for routine identification. They are illustrated primarily to assist future workers who may wish to compare Nearctic species with those of other regions.

In describing the male genitalia, I have used the terminology utilized by Hanson (1958) which is evidently derived from that proposed by Michener (1944). Important structures include the gonostylus (=dististylus, telomere), the gonocoxites (=synsternite, basistyle), and the aedeagal complex, which is composed of a median aedeagus (=penis) and lateral aedeagal valves (=penis valves, parameres). The gonocoxites have a rather distinctive shape in each species, with the posterior margin of the ventral bridge being particularly diagnostic. It is often endowed with a median process, which has been called the median process of the synsternite by Rozkošný (1973). Dorsal views are illustrated for both the genital capsule and the aedeagus, as well as a lateral view for the latter structure, which is frequently strongly arcuate. A dorsal view of the post-genital segments is also included, which is composed of the tenth and eleventh tergites and the cerci. The shape of the tenth tergite is often char-



acteristic at the specific level, and in *Beris fuscipes* it possesses posterolateral surstyli.

### SUBFAMILY BERIDINAE

*Diagnosis.* These flies can be separated from other Nearctic Stratiomyidae by the presence of preapical tergal grooves on abdominal tergites two to six in all genera except *Exodontha*. *Exodontha* may be assigned to the subfamily because it possesses a spur on the middle tibia (a character shared with *Allognosta*), which is absent in all other Stratiomyidae outside of the Beridinae. All Nearctic genera except *Allognosta* possess at least four scutellar spines, while taxa outside the Beridinae possess no more than two. Other characters which most members of the subfamily exhibit include porrect antennae, with a simple flagellum normally composed of eight flagellomeres; palpi usually distinct, two-segmented (one-segmented and minute in *Beris*) and porrect; labellae of proboscis not strongly sclerotized; wing venation not as strongly crowded toward anterior margin of wing as in other Stratiomyidae, the wings normally evenly set with microtrichia;  $M_3$  present or absent;  $M_4$  arises from the discal cell; abdomen usually with seven more or less undifferentiated segments (five in *Exodontha*); male genitalia visible externally, aedeagal complex trifid; female cerci two-segmented.

Most North American species of Beridinae are poorly known biologically. The larvae of only two Nearctic species are known and were briefly treated by McFadden (1967). Label data, personal discussions with other entomologists, and morphology suggest that all Nearctic species, with the possible exception of the species of *Exodontha*, form conspecific male swarms. The structure of the male eyes conforms to that reported for swarming Diptera (Downes, 1969; McAlpine and Monroe, 1968), and the inflated hind basitarsus found in males of *Actina* and *Beris* possibly has a function

related to swarming behavior. I have personally observed members of the Neotropical beridine genus *Oplachantha* Rondani in male swarms.

#### KEY TO THE NEARCTIC GENERA OF BERIDINAE

1. Middle tibia with a single, small, apical spur; abdomen ovate ..... 2  
Middle tibia without an apical spur; abdomen elongate ..... 3
2. Scutellum without spines; abdominal tergites with preapical transverse grooves;  $M_3$  absent; smaller species, less than 6 mm. .... *Allognosta* Osten Sacken (p. 327)  
Scutellum with spines; abdominal tergites without preapical transverse grooves;  $M_3$  present; larger species, greater than 7 mm ..... *Exodontha* Rondani (p. 346)
3. Palpi minute, one-segmented; males holoptic; scutellum normally with six or more spines ..... *Beris* Latreille (p. 336)  
Palpi elongate, two-segmented, easily visible; males dichoptic; scutellum normally with four spines ..... *Actina* Meigen (p. 322)

### Genus ACTINA Meigen

*Actina* Meigen, 1804: 116; type species *Beris nitens* Latreille (Rondani, 1863: 87).

*Allactina* Curran, 1924: 24; type species *Beris viridis* Say, by original designation.

*Diagnosis.* Members of the genus *Actina* may be recognized easily by their four scutellar spines and well-developed, two-segmented palpi. It is likely to be confused only with *Beris*, which is also elongate in form, but that genus possesses very minute, one-segmented palpi and at least six scutellar spines. In addition, males of *Actina* are the only Nearctic Beridinae of that sex which are dichoptic. Other generic characters are: eyes pilose in both sexes; antennae with first segment at least two times as long as second, flagellum elongate with eight distinct flagellomeres; face receding, oral margin not produced; palpi slender in male, more robust in female; legs with hind femora much longer than middle and front femora, almost twice as long in males; hind tibiae and femora clavate; hind basitarsi of males noticeably inflated, second hind tarsomere also slightly



inflated; middle tibiae without spurs; wings with  $R_{2+3}$  arising at or slightly beyond r-m,  $R_4$  present,  $M_1$  and  $M_2$  petiolate to widely separate at discal cell,  $M_3$  normally absent; abdomen of male parallel-sided, fifth and sixth segments slightly wider, female abdomen slender but ovate; both sexes with tergal grooves on segments two to six; male genitalia with spinose membrane between aedeagal complex and genital capsule; gonostyli with internal median tooth.

There is only one Nearctic species of *Actina*. Elsewhere, there is one European species, several from the eastern Palaearctic, and five species in the Oriental Region (James, 1975). Species from the Australian Region presently ascribed to *Actina* may not be congeneric, but exclusion must await a study of the fauna of that region.

### *Actina viridis* (Say)

*Beris viridis* Say, 1824: 368.

*Actina viridis* var. *obscuripes* Johnson, 1926a: 90.

**Type Material.** The type of *Beris viridis* Say is believed to be destroyed (Lindroth and Freitag, 1969). The material Say examined was from Pennsylvania, and probably consisted of a series of females.

The holotype male of *Actina viridis* var. *obscuripes* Johnson is presently housed in the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts (MCZ 27272). The wings are slightly folded, but it is otherwise in excellent condition.

**Diagnosis.** There is only one species of *Actina* in the Nearctic Region, *A. viridis* (Say), which may be recognized on the basis of the generic characters.

**Description. Male.** Head black, frons slightly converging toward antennae, 0.19 to 0.22 width of head, shiny green to bluish, silvery pollinose just above antennae, dull velvety black along inner eye margins from level of anterior ocellus to about two-thirds of the way to anten-

nae; face slightly diverging toward oral margin, blackish with slight metallic reflections, grayish pollinose except for very narrow median line; occiput dark pollinose except for cerebrale, which is concolorous with frons; frons (except for small bare area just above pollinose portion), face, upper cerebrale, and outer edge of occiput with long black hairs, each hair slightly bent medially and about the length of the first two antennal segments combined, but pile just above antennae slightly shorter than second antennal segment; genae with darkish pile about two-thirds length of frontal pile; antennae black; first segment 2.5 times as long as second, slender, slightly expanded apically; flagellum about 1.5 times the length of both basal segments combined, conically tapered (Fig. 1); longer hairs of antennae black; eyes with short, dark pilosity; ocellar tubercle slightly prominent; palpi brownish to black, second segment very narrow at base, expanded apically; proboscis yellow, with very pale pile. Thorax shiny metallic green, sometimes ranging to bluish, occasionally with bronzy or coppery reflections, becoming less shiny and more brownish ventrally and just below wing; humeri and postalar calli more blackish brown, the latter sometimes brownish; scutellum with four yellow spines; thoracic pilosity quite variable in color and length: some hairs short and usually mostly pale, longer hairs subequal to frontal hairs or a little longer, ranging from almost wholly pale to mostly dark; pleural pile nearly as long, middle of mesopleuron and hypopleuron bare; legs with coxae brownish, remainder yellowish except for front tarsi, apical three tarsomeres of middle tarsi, apices of hind femora, apical halves of hind tibiae, and apical three tarsomeres of hind tarsi brownish, basal two tarsomeres of hind legs whitish, the extreme apices pale brownish; legs ranging in dark specimens to wholly brownish black except for extreme apices of front and middle femora, extreme bases of all tibi-

ae, extreme bases and ventral surfaces of middle and hind basitarsi as well as ventral surface of second tarsomeres of hind legs, which are yellowish; legs with abundant long pile, pale to dark (always with at least a few dark hairs), on posterior surfaces of front femora; middle femora with a few hairs, shorter than those on front femora, longer ventrally; hind femora with a few longer hairs dorsally at base; posterior surfaces of fore and middle tibiae with a few longer hairs, usually at least two, often six to eight; halter yellow, stem often brownish; wings hyaline, veins brownish, stigma brown and contrasting strongly with wing membrane; the membrane evenly set with microtrichia except at extreme base and basal regions of second basal and anal cells. Abdomen brownish to brownish black, often with metallic reflections on lateral margins of tergites and most of sternites; medial portions of tergites pollinose, sparse on sixth tergite and absent on posterior segments; pile long laterally, subequal to mesonotal pile, somewhat shorter and sparser ventrally; pile of pollinose areas may be dark, pile of other areas pale, but in very dark specimens a few dark hairs may be present on the lateral portion of the first segment; tenth tergite and cerci yellow; genitalia (Figures 11–13, 15) with gonostyli possessing an internal medial tooth; aedeagal complex with lateral valves parallel-sided, slightly widened apically, their inner margins diverging apically (Fig. 12). Length 4.3 to 6.4 mm.

*Female.* Differs from male as follows: head smaller, with upper frons shinier, almost impunctate, wider (0.25 to 0.31 width of head), and the velvety black spots along eye margins smaller; face with larger central shiny region; pile of head sparser, much shorter (less than the length of the second antennal segment except on genae where it is slightly longer than that segment), and mostly pale, but a few dark hairs sometimes present around antennal bases; antennae longer,

with basal two segments yellow, flagellum more slender, basal flagellomere not as wide as in male, the entire flagellum tapering more gradually (Fig. 2); basal flagellomere mostly yellow, inner portions of the next two yellowish, ranging in some specimens to basal three flagellomeres and inner portions of four to six yellowish; hairs on basal segments black; palpi yellow; pile of eyes extremely short and sparse. Thorax with short, pale pile, about the length of that on head but becoming a little longer on pleura; mesonotum bright metallic green to blackish green, humeri and postalar calli yellowish, sometimes brownish; legs wholly yellow except for tarsomeres of front legs and distal three tarsomeres of middle and hind legs brownish, ranging in some specimens to yellow with brownish coloration on apices of hind femora, apical two-thirds of front tibiae, hind tibiae except for short basal regions, front tarsi, apical third of first tarsomere and entire tarsomeres two to five of middle tarsi, apices of basal two tarsomeres and entire tarsomeres three to five of hind tarsi. Abdomen lighter in color, brownish to brownish yellow, often with metallic reflections, especially on basal three tergites, and often with lateral and outer posterior margins of tergites yellowish; sternites ranging from wholly brownish to wholly yellow, without metallic reflections; cerci yellow; pile of abdomen shorter than in male, wholly pale; genitalia (Fig. 14) with posterolateral processes of furca long, converging; posterior portions of spermathecal ducts unsclerotized; median aperture of furca large. Length 4.2 to 5.9 mm.

*Distribution* (Map 1). Nearctic; northern British Columbia east to Labrador. south to Utah, New Mexico, east to northern Georgia.

*Locality Records* (1149 males; 703 females). CANADA: *Alberta*: Cooking Lake; Edmonton; Gull Lake; Jumping Pond Creek, 20 mi. W of Calgary; Slave

Lake; Wabamun. *British Columbia*: Fort Nelson; Gagnon Rd., 6 mi. W of Terrace, 220 ft.; Terrace; Trinity Valley; Vernon. *Labrador*: Goose Bay. *Manitoba*: Aweme; Carberry; Cedar Lake; Minnedosa; Ninette; 5 mi W. of Shilo; Treesbank. *New Brunswick*: Hwy. 27, 8 mi. S of McAdams; Barber D.; E. Sussex; Penobsquis Camp, Rte. 1; St. Jacques; St. John. *Newfoundland*: Mts. E of Codroy; Lomond. *Nova Scotia*: Truro. *Ontario*: Bell's Corners; Black Rapids; Britannia; Coldwater; Crozier; 6 mi. S of Devlin; Dryden; Eagle; Finland; Ft. Frances; Go Home Bay, 8 mi. W of Bala; Grimsby; Guelph; Hallville; Jordan; Kingsville; Low Bush, Lake Abitibi; Marmora; Maynooth; Mer Bleu; Moose Factory; Normandale; Ogoki; Orillia; Osgoode; Ottawa; Petawawa; Pinewood; Pt. Pelee; Port Hope; Rainy River; Rondeau; Simcoe; Stittsville; Sturgeon Bay; Tillsonburg; Tobermory. *Quebec*: Abbotsford; Anticosti; Aylmer; Beechgrove; Breckenridge; Burbridge; Fabre; Fairy Lake; Farnham; Gaspe; Gracefield; Harrington Lake, Gatineau Park; Hull; Kazubazua; Knowlton; Laniel; La Verendrye Prov. Park, Rte. 58, mi. 139; Megantic; Mistassini Post; Montreal; Mt. Orford, 1200 ft.; Mt. Ste. Hilaire, 500–700 ft.; Nominique; Old Chelsea, King Mt., 1500 ft.; Queens Park; Roundtop Mt., 1300 ft.; Sutton; Rupert House; Ste. Anne des Monts; Valtetreau. *Saskatchewan*: Big River; Glaslyn; Kenosee. **UNITED STATES**: *Arkansas*: Garland Co.; Mississippi Co.; Washington Co. *District of Columbia*: Washington. *Georgia*: Clarke Co.; Dawson Co.; DeKalb Co.; Houston Co.; Lumpkin Co.; Rabun Co.; Towns Co.; Union Co. *Illinois*: Adams Co.; Boone Co.; Champaign Co.; DeWitt Co.; Douglas Co.; DuPage Co.; Jackson Co.; Lake Co.; LaSalle Co.; McHenry Co.; McLean Co.; Macoupin Co.; Mason Co.; Morgan Co.; Rock Island Co.; Tasewell Co.; Union Co.; Vermilion Co. *Indiana*: Marion Co.; Pulaski Co.; Tippecanoe Co. *Iowa*: Boone Co.; Story Co.; Woodbury

Co. *Kansas*: Douglas Co.; Johnson Co.; Leavenworth Co.; Lyon Co.; Riley Co. *Kentucky*: Greenup Co.; Nelson Co. *Maine*: Hancock Co.; Piscataquis Co. *Maryland*: Montgomery Co.; Prince Georges Co. *Massachusetts*: Berkshire Co.; Essex Co.; Middlesex Co.; Norfolk Co.; Worcester Co. *Michigan*: Arenac Co.; Charlevoix Co.; Chippewa Co.; Delta Co.; Hillsdale Co.; Ingham Co.; Kalamazoo Co.; LaPeer Co.; Livingston Co.; Roscommon Co.; Washtenaw Co.; Wayne Co. *Minnesota*: Anoka Co.; Carver Co.; Clay Co.; Clearwater Co.; Cook Co.; Crow Wing Co.; Dakota Co.; Fillmore Co.; Freeborn Co.; Goodhue Co.; Hennepin Co.; Houston Co.; Koochiching Co.; Lake Co.; Lake of the Woods Co.; Lyon Co.; Marshall Co.; Mille Lacs Co.; Norman Co.; Olmstead Co.; Pine Co.; Pipestone Co.; Pope Co.; Ramsey Co.; Red Lake Co.; Rice Co.; Roseau Co.; St. Louis Co.; Wabasha Co.; Wadena Co.; Washington Co.; Winona Co. *Mississippi*: Lafayette Co. *Missouri*: Jackson Co.; Phelps Co. *Nebraska*: Boone Co.; Cass Co.; Cherry Co.; Lancaster Co.; Sharp Co. *New Hampshire*: Grafton Co. *New Jersey*: Bergen Co.; Burlington Co.; Gloucester Co.; Ocean Co.; Sussex Co. *New Mexico*: Otero Co. *New York*: Clinton Co.; Cortland Co.; Erie Co.; Lewis Co.; Niagara Co.; Ontario Co.; Orange Co.; Oswego Co.; Suffolk Co.; Tompkins Co. *North Carolina*: Buncombe Co.; Graham Co.; Haywood Co.; Jackson Co.; Johnston Co.; Macon Co.; Pender Co.; Swain Co.; Yancey Co. *Ohio*: Delaware Co.; Franklin Co.; Hocking Co.; Madison Co.; Ottawa Co.; Summit Co.; Tuscarawas Co. *Pennsylvania*: Dauphin Co.; Erie Co.; Indiana Co.; Lebanon Co. *Rhode Island*: Washington Co. *South Dakota*: Grant Co. *Tennessee*: Campbell Co.; Hamilton Co.; Knox Co.; Montgomery Co.; Sevier Co. *Texas*: Dallas Co. *Utah*: Millard Co. *Vermont*: Bennington Co.; Caledonia Co.; Orleans Co.; Windham Co. *Virginia*: Arlington Co.; Augusta Co.; Fauquier Co.; Fairfax Co.; Page



Co.; Roanoke Co. *West Virginia*: Hampshire Co.; Jefferson Co. *Wisconsin*: Dane Co.; Door Co.; Polk Co.; Sauk Co.; Washburn Co.

*Flight Period.* Specimens have been collected from 25 March (only two March records) to 30 July. The predominant months of activity are May and June throughout the range, although in southern states a number of specimens have been collected in April.

*Biology.* The larval stages of *Actina viridis* are unknown, but the larva of *Actina nitens* (Latreille), a closely related European species, is being described by Rozkošný (in preparation). Adults have been taken at black lights and in Malaise traps. They have also been collected on a number of plants, presumably by sweeping: alfalfa (Minnesota, New York), aspen (Alberta), *Barbarea* (Ontario), cedar (Quebec), choke cherry (Manitoba), *Equisetum* (Manitoba), *Geranium maculatum* (Virginia), *Ledum* (Ontario), locust (Georgia), Norway pine (Minnesota), *Prunus virginiana* (Illinois), *Prunus* sp. (Nebraska), *Ribes* sp. (Manitoba), *Salix* sp. (Alberta, Ontario, Nebraska), and *Taraxacum officinale* (Ontario). Males have been collected in conspecific swarms in wooded areas in Kansas (McGinley, personal communication).

*Remarks.* *Actina viridis* is the most common member of the subfamily in North America, and is one of the most common Stratiomyidae in the Nearctic Region. It cannot easily be confused with any other species. Since the lectotype designation presented elsewhere in this paper has removed *Beris quadridentata* Walker from synonymy with this name, there are no synonymous specific names, only one varietal one. Consequently, there seems to be no reason for designating a neotype for this species at present, even though the original type material is destroyed. Any such action should be left to future authors, if additional species of the genus are discovered in the Nearctic Region. Say's mention in the original de-

scription of the bright green coloration of the head and thorax and the four yellowish scutellar spines leaves little doubt that he was describing this common species.

This species is quite variable. Color, particularly of the legs, varies greatly. The legs range from largely yellow to almost wholly blackish brown. Darker specimens are found in the northern areas of the range, and at high altitudes in more southern areas. In fact, the darkest specimens I have examined were from Clingman's Dome, Great Smoky Mountains National Park, Tennessee. There is also a gradual trend toward smaller size toward more northern latitudes. It seems likely that the darker specimens are a result of environmental conditions, perhaps cold temperatures. Johnson's *Actina viridis* var. *obscuripes* is based on dark specimens from Anticosti, Quebec, and the name was synonymized by McFadden (1972). I agree with his decision as there is no sharp difference between any light and dark forms with respect to geographic location such that a subspecific designation is warranted. Wing venation in the species is also variable. The bases of  $M_1$  and  $M_2$  at the discal cell may be petiolate, or widely separate, or anywhere between these two extremes. I have observed specimens collected at the same locality on the same day with the entire range of variation.  $M_3$  is occasionally present in some specimens as a small stub, sometimes only on one wing. One otherwise typical specimen was noted with  $R_4$  absent.

Because of the variable nature of this species, I checked genitalia from a number of localities as well as from light and dark forms to try to detect any differences that might indicate more than one species was present. Although the shape of the gonostyli is somewhat variable, particularly with respect to the size of the lobe above the median tooth, I detected no differences that indicated the presence of more than one species. The shape

of the lateral valves of the aedeagal complex is particularly diagnostic, and is quite constant. I have examined the aedeagal complex of *Actina nitens* as well as a species from Taiwan for comparison, and both were distinctly different from *Actina viridis*. Thus, at present, it can be concluded that one rather variable species of *Actina* occurs in the Nearctic Region.

### Genus ALLOGNOSTA Osten Sacken

*Allognosta* Osten Sacken, 1883: 297; type species *Beris fuscitarsis* Say (Coquillett, 1910: 505).

**Diagnosis.** Members of the genus *Allognosta* may be separated from other Beridinae in North America by the lack of spines on the scutellar margin. All other genera in the Nearctic Region have at least four scutellar spines. Other features exhibited by the genus include: eyes bare to sparsely pilose; males holoptic, females dichoptic; antennae with simple, eight-segmented flagellum; palpi large, two-segmented; middle tibiae with one small apical spur; abdomen flattened, ovate, the seventh segment somewhat reduced; tergites two to six with preapical grooves; wing with  $R_4$  and r-m present,  $M_3$  absent,  $M_1$  and  $M_2$  separate at discal cell.

Enderlein (1921), apparently unaware of Coquillett's designation of *Beris fuscitarsis* Say as the type species for *Allognosta*, designated the Palearctic species *Metoponia vagans* Loew as the type species. This is, of course, invalid, as Coquillett's designation was earlier.

There are three valid species of *Allognosta* in North America, found primarily in the eastern half of the continent. Although there are no synonyms of the generic name, only *A. brevicornis* was described in the genus. Early authors described species in *Beris* or *Sargus*, and two others were described in *Metoponia*. This last name is based upon a type species in the Chiromyzinae, and it is not surprising that members of *Allognosta* were described in that genus since the

Chiromyzinae also have the sixth and seventh abdominal segments rather large and undifferentiated, and lack scutellar spines.

*Allognosta* occurs in the eastern Palearctic Region, and is particularly rich in species in the Oriental Region, where there are currently 25 nominal species (James, 1975). Species from Africa presently placed in *Allognosta* may belong in other genera, but I have not examined any specimens of the two species described from that continent.

#### KEY TO THE NEARCTIC SPECIES OF ALLOGNOSTA

1. Males (holoptic) ..... 2  
    Females (dichoptic) ..... 4
2. Hairs of face silvery, at most as long as first antennal segment; ventral portion of mesopleuron usually with shiny area devoid of pollinosity; medial portion of ventral bridge of gonocoxites weakly produced, with only two small lobes (Fig. 23) ..... *fuscitarsis* (Say)  
    Hairs of face usually dark, and usually longer than the first antennal segment; ventral portion of mesopleuron without bare, shiny area; medial portion of ventral bridge of gonocoxites strongly produced (Figs. 19, 28) ..... 3
3. Antennae short, the flagellum strongly tapering toward apex (Fig. 3); mesonotum somewhat shiny, usually bronzy black; process of ventral bridge of gonocoxites strongly bilobed (Fig. 19); gonostylus rounded at apex ..... *brevicornis* Johnson  
    Antennae longer, the flagellum more slender and tapering more gradually toward apex (Fig. 5); mesonotum less shiny due to coarser punctation, although it may have metallic reflections; process of ventral bridge of gonocoxites only feebly emarginate at middle (Fig. 28); gonostylus pointed at apex ..... *obscuriventris* (Loew)
4. P.   reddish to yellowish; frons below transverse sulcus wholly pollinose ..... *brevicornis* Johnson  
    Pleura dark, nearly concolorous with mesonotum; frons below transverse sulcus normally with lateral bare areas ..... 5
5. Mesopleuron with a ventral, shiny, bare area; face with hairs pale, no longer than the first antennal segment; disc of abdomen often yellowish, contrasting with lateral margins ..... *fuscitarsis* (Say)  
    Mesopleuron without a ventral, shiny, bare area, completely pollinose; face with

hairs usually blackish, longer than first antennal segment; disc of abdomen usually dark -----*obscuriventris* (Loew)

### *Allognosta brevicornis* Johnson

*Allognosta brevicornis* Johnson, 1923: 71.

*Type Material.* The holotype specimen is presently housed in the Museum of Comparative Zoology (MCZ 14928). It is a male from Norwich, Vermont. It is missing the right flagellum of the antennae, the right middle leg, and both hind legs; the right wing and abdomen are glued to a small paper card attached to the pin below the specimen.

*Diagnosis.* Females are distinguished easily from other Nearctic species of the genus by the reddish and yellowish pleura. Males may be recognized by their short antennae and distinctive genitalia, especially the strongly bilobed medial process of the ventral bridge of the gonocoxites (Fig. 19). The small size is somewhat distinctive, as is the wholly dark abdomen.

*Description. Male.* Head brownish to black, frons and face densely silvery gray pollinose, rest of head grayish pollinose except for genal area, cerebrale, and the somewhat prominent ocellar tubercle, which are shiny; pile of face brownish, a little longer than the first antennal segment, that on genae longer than the first two antennal segments combined, pale to blackish; antennae about 0.7 times length of head, first two segments brownish to black, second sometimes yellowish; flagellum brownish black, sometimes with first flagellomere and inner portions of flagellomeres two to five yellowish; longer hairs of antennae black; palpi with first segment yellowish to brownish, second dark brown, both with dark hairs, first segment with a few pale hairs; proboscis yellowish. Thorax with mesonotum and scutellum dark brownish black with faint bronzy reflections, humeri and postalar calli paler; pleura brownish, sclerites directly beneath wing more yellowish; prothorax and pleura pollinose except for

most of sternopleuron and pteropleuron; mesonotal pile mostly dark, pleural pile with a mixture of pale and dark hairs; legs with front and middle coxae yellowish, hind coxae brownish yellow, femora yellow except for apices of hind femora evanescently brownish; tibiae yellowish, grading evenly to brownish on apical halves, tarsi brown except for extreme apices of tarsomeres one to four of all tarsi, and basal three-fourths of hind basitarsi, yellowish; halter brown, stem yellowish; wing light brownish, evenly set with microtrichia, stigma weakly contrasting with rest of wing. Abdomen brown, dorsally thinly pollinose; longer hairs mostly dark dorsally, mostly pale ventrally; hypopygium concolorous with abdomen; genitalia (Figs. 16–19) with gonostyli large, scoop-shaped, the inner apical surface strongly concave (Fig. 19); medial process of ventral bridge of gonocoxites strongly produced, bilobed, apices of lobes with short spicules (Fig. 19); aedeagus shorter than lateral valves, which diverge slightly at apex (Fig. 17). Length 4.2 to 4.4 mm.

*Female.* Differs from male as follows: head brownish to blackish, gray pollinose on frons below transverse sulcus and face, faintly so on dorsolateral border of occiput, rest of head shiny, finely punctate; pile of head pale, shorter than first antennal segment except on genae, where it is a little longer than that segment; frons gradually narrowing toward antennae, 0.40 to 0.50 width of head at anterior ocellus; first two antennal segments yellow, flagellum usually with inner portions of flagellomeres two to five extensively yellowish; palpi with first segment usually yellowish. Thorax with entire prothorax, humeri, postalar calli, and pleura of mesothorax yellowish, except for basal three-fourths of sternopleuron which is brownish, although the mesopleuron occasionally has evanescent brownish tinges; mesonotal pile pale, more appressed and shorter than in male, rest of thoracic pile also pale; legs with



coxae, femora, and tibiae yellow, sometimes with tibiae brownish as in male; tarsi with basal halves of all front and middle tarsomeres often yellowish, otherwise as in male; halter with knob yellow to brown; genitalia (Fig. 32) with furca reduced, the median aperture very large; lateral processes present and strongly diverging anteriorly; spermathecal ducts unsclerotized posteriorly. Length 3.9 to 4.9 mm.

*Distribution* (Map 2). Quebec and New Brunswick south to Tennessee and North Carolina, and west to British Columbia.

*Locality Records* (6 males, 41 females). CANADA: *Alberta*: Elk Island. *British Columbia*: Kleanza Creek, 14 mi. E of Terrace; Lac la Hache. *New Brunswick*: Doaktown, Hwy. 8. *Ontario*: Maynooth; One Sided Lake; Ottawa. *Quebec*: Bolton Pass, Knowlton, 800 ft.; Duncan Lake, near Rupert; King Mtn., Old Chelsea. UNITED STATES: *Maine*: Salisbury Cove; Hancock Co., Bar Harbor; Penobscot Co., Passadumkeag. *Massachusetts*: Essex Co., Gloucester. *Minnesota*: Itasca Co., T-57, R-24, S-26. *New Hampshire*: Cheshire Co., Jaffrey. *New York*: Uphill Brook, 3200 ft.; Essex Co., Lake Tear, 4300–4600 ft.; Greene Co., 2500 ft. *North Carolina*: Highlands, 3800 ft.; Graham Co., Robbinsville. *Tennessee*: Monroe Co., 20 mi. E of Tellico Plains, 2080 ft. *Vermont*: Bolton Mtn.; E. Charleston; Windsor Co., Norwich.

*Flight Period*. Collection dates range from 26 May to 9 August, with most specimens being taken in June or July.

*Biology*. The immature stages are unknown. Adults have been collected on "liliaceous undergrowth-hemlock forest" (British Columbia), "ex *Spiraea*" (Ontario), and by sweeping *Kalmia angustifolia* (Quebec).

*Remarks*. *Allognosta brevicornis* remains the least known species of the genus in North America. Specimens, particularly of males, are rare in collections. Consequently, little can be said concern-

ing the range of variation within the species, but it is easily recognizable. It is the only member of the genus known to occur west of the Rocky Mountains.

### *Allognosta fuscitarsis* (Say)

*Beris fuscitarsis* Say, 1823: 29.

*Sargus dorsalis* Say, 1824: 377.

*Sargus pallipes* Wiedemann, 1830: 41.

*Beris brevis* Walker, 1848: 127.

*Beris lata* Walker, 1848: 127.

*Type Material*. The type (sex not stated, and not determinable from the original description) of *Beris fuscitarsis* Say was described from Pennsylvania. The scutellum was broken; thus Say could not have known that it was spineless, and thus he placed the species in *Beris*. The specimen is believed to be destroyed (Lindroth and Freitag, 1969), and to preserve the stability of the present usage of this name, it seems advisable to designate a neotype. I hereby designate a male specimen in the Museum of Comparative Zoology as neotype of this species; it is labeled "Lehigh Gap VII.9.07 Pa/ Collected by C. T. Greene/ Collection C. W. Johnson/ NEOTYPE *Beris fuscitarsis* Say, 1823: 29 des. N. E. Woodley 1980 MCZ # 32553/ *Allognosta fuscitarsis* (Say) det. Woodley 1979." The neotype label is red. The specimen fits the original description fairly well. Although the description is brief, the pale disc of the abdomen with "brown incisures" and coloration of the legs of the neotype specimen agree with it. The neotype is from Pennsylvania and agrees with my diagnosis of this species, which is given below. The neotype is missing the right front leg, but is otherwise in good condition.

The type material of *Sargus dorsalis* Say is also lost. It seems quite likely that it was conspecific with *A. fuscitarsis* as suggested by previous authors. Say's description of the abdomen and legs especially seems to fit *A. fuscitarsis*, but could be interpreted as fitting light-colored specimens of *A. obscuriventris* (Loew). The latter interpretation, if fol-

lowed, would cause *Sargus dorsalis* to have priority over *Metoponia obscuriventris* Loew, a name that has seen long standing use. To preserve the present synonymy, it seems best to designate a neotype for *Sargus dorsalis*. I am hereby designating a male specimen in the Museum of Comparative Zoology as neotype, labeled: "Lexington, Ky. May 19-24, 1972 Malaise Trap/ P. H. Freytag Collector/ NEOTYPE *Sargus dorsalis* Say, 1824: 377 des. N. E. Woodley 1980 MCZ # 32554/ *Allognosta fuscitarsis* (Say) det. Woodley 1979." The specimen fits the Say description quite well, except that the fourth and fifth abdominal tergites are pale yellow on the disc. Say, in mentioning that the first three tergites were pale centrally, probably was referring to the first four, as the first and second tergites are fused and the suture is obsolete. The neotype is from Kentucky, which was cited as the type locality by Say. He mistakenly placed the species in *Sargus*, probably because the scutellum lacked spines and the third antennal segments were broken off. Say stated that he examined both male and female specimens, but mentioned that the sexes were similar. He probably saw only males, as females of this species have widely separated eyes, which he probably would have noted. Males are indicated by his statement "stemmata approximate on vertex." The neotype male fits my diagnosis of *A. fuscitarsis* presented below.

The name *Sargus pallipes* Wiedemann remains somewhat enigmatic. Wiedemann attributed the name to Say, although the latter described only one Nearctic Stratiomyidae with the name *pallipes*, and that clearly belongs to the genus *Nemotelus* Geoffroy. It is curious that the names *Beris fuscitarsis* and *Nemotelus pallipes* appear on the same page of Say's work (1823: 29), and that the type locality of both is cited as "Pennsylvania," the same locality given by Wiedemann for *Sargus pallipes*. It seems at least possible that Wiedemann made

some sort of transcription error, and was really referring to *A. fuscitarsis*, but it seems unlikely in that case for him to have attributed the name to *Sargus*, since he had earlier combined Say's *Sargus dorsalis* with *Beris* (Wiedemann, 1828: 540). If, however, Wiedemann was describing a specimen that he thought was a new species, it was probably in Say's collection and is now destroyed, as he mentioned that it was in the Philadelphia museum. Due to the uncertainty surrounding the name, I prefer not to designate a neotype for it, particularly since Wiedemann attributed the name to Say. It may well be a *nomen nudum*.

The types of *Beris brevis* and *Beris lata*, both described by Walker (1848), are in the British Museum. I have examined both specimens, and they are clearly *Allognosta fuscitarsis*, as has been noted previously by various authors. I have added determination labels to both. The specimen of *Beris brevis* was not previously labeled as a type, but has a locality label stating "Trenton" and another label reading "New York, pres. by E. Doubleday." These agree with the information published by Walker with his description. I have added a red label indicating that this is the type, and the fact that I added the label.

**Diagnosis.** Males and females may be separated from other species of Nearctic *Allognosta* by the unique shiny, bare area on the ventral portion of the mesopleuron. The male genitalia are diagnostic, particularly the posteromedian portion of the ventral bridge of the gonocoxites, which is not produced as in the other two species (Fig. 23); this is usually visible without dissection. Other diagnostic features include the long basal flagellomere of the antenna (Fig. 4), and the short, pale facial hairs. The transparent wing with contrasting stigmal area is also characteristic.

**Description. Male.** Head black, frons and face densely silvery pollinose except for a tiny, shiny triangle dorsally on frons;

ocellar tubercle shiny black, somewhat prominent; rest of head grayish pollinose, becoming less dense on genal region and on cerebrale; face with pale pile about the length of the first antennal segment, genal region with pale pile somewhat longer than the first two antennal segments combined; eyes bare; antennae (Fig. 4) about 0.8 times length of head, with first two segments and first two flagellomeres yellow (first segment sometimes brownish), apical flagellomeres brownish black, sometimes yellowish on inner portions of three to five; longer hairs of antennae black; palpi brownish black, with a mixture of pale and dark hairs; proboscis yellowish. Thorax with mesonotum and scutellum shiny black, humeri and postalar calli usually paler, brownish to yellowish; prothorax and pleura brownish black, with thin silvery pollinosity except for shiny, bare areas on extreme dorsal, ventral, and posterior margins of mesopleuron, a large postero-medial patch and ventral portion of sternopleuron, and most of pteropleuron; longer hairs of thorax pale; legs yellow except for dark brownish coloration on apical two-thirds of fore tibiae (especially dorsally), fore tarsi, apical four tarsomeres of middle tarsi, hind tibiae except extreme bases, apical three tarsomeres of hind tarsi, and rather diffuse anterior areas on the hind femora (rarely entire hind femora dark); ranging in some specimens to light brown, with yellow areas on fore tibiae and hind femora reduced; hind coxae brownish; wings almost clear, evenly set with microtrichia, with evanescent infuscation anteriorly; stigma dark, contrasting strongly with the rest of wing; halter with stem yellow, knob yellow with brownish base to wholly brown. Abdomen creamy yellow except for lateral margins and narrow posterior margins of tergites one to four, lateral margin and apical half of tergite five, and remaining tergites dark brown, often with tergite five wholly brown; sternites one to four with lateral margins evanescently

brownish, remaining sternites brownish; pile of abdomen mostly dark dorsally, pale ventrally; hypopygium brownish, becoming yellow on gonostyli and cerci; genitalia (Figs. 20–23) with medial region of ventral bridge of gonocoxites not produced, feebly bilobed (Fig. 23); gonostyli arcuate, slender, rounded apically; aedeagus slightly shorter than lateral valves, which diverge slightly apically, the three lobes of the complex well separated (Figs. 21, 22). Length 4.3 to 6.1 mm.

*Female.* Differs from male as follows: head brownish black, silvery gray pollinose below transverse sulcus of frons except areas on each side slightly above and lateral to antennae, which are nearly bare and shiny; upper frons subparallel to slightly convergent toward antennae, 0.33 to 0.41 width of head at anterior ocellus, diverging below transverse sulcus, finely punctate, middle with elongate, oval, shallow depression; antennal flagellomeres three to five usually yellowish internally, rest brownish to black. Thorax with thin dorsal strip and entire ventral half of mesopleuron bare and shiny. Abdomen ranging in coloration from that described for male to wholly dark brown, usually with pale markings when present restricted to medial portions of tergites; tenth tergite and cerci yellowish; genitalia (Fig. 31) with furca emarginate laterally, the median aperture truncate anteriorly; spermathecal ducts unsclerotized posteriorly. Length 4.1 to 6.3 mm.

*Distribution* (Map 4). Nova Scotia and northern Maine west to southern Manitoba, south to Arkansas and northern Florida.

*Locality Records* (383 males; 577 females). CANADA: *Manitoba*: 5 mi. W of Shilo. *New Brunswick*: Fredericton. *Nova Scotia*: Lockport; Truro. *Ontario*: Anacaster; Blackburn; Cornwall; Emo; Finland; Fort Frances; Grimsby; Jordan; Kelly Lake; Mer Bleu, 5 mi. E of Ottawa; Niagara Falls; Orillia; Ottawa; Picton; Pt. Pelee; Simcoe; Smith's Bay, near Picton;



Stittsville. *Quebec*: Belanger; Breckenridge; Fabre; Hemmingford; Knowlton; Laval; Missisavoiv River, Bolton; Montreal; Richelieu; Wakefield. **UNITED STATES**: *Alabama*: Lee Co. *Arkansas*: Conway Co.; Mississippi Co. *Connecticut*: Fairfield Co.; Hartford Co.; Litchfield Co.; New Haven Co. *District of Columbia*: Washington. *Florida*: Alachua Co. *Georgia*: Clarke Co.; Floyd Co.; Fulton Co.; Oconee Co.; Rabun Co.; White Co. *Illinois*: Adams Co.; Bond Co.; Bureau Co.; Carroll Co.; Champaign Co.; Jo Daviess Co.; Kane Co.; Lake Co.; La Salle Co.; McHenry Co.; McLean Co.; Macoupin Co.; Madison Co.; Ogle Co.; Tazewell Co.; Union Co.; Vermilion Co.; Winnebago Co. *Indiana*: Brown Co.; Marion Co.; Randolph Co.; Tippecanoe Co. *Iowa*: Johnson Co.; Scott Co.; Story Co.; Woodbury Co. *Kansas*: Douglas Co. *Kentucky*: Bullitt Co.; Fayette Co.; Nelson Co. *Maine*: Aroostook Co.; Hancock Co.; Oxford Co.; Penobscot Co.; York Co. *Maryland*: Anne Arundel Co.; Montgomery Co.; Prince Georges Co. *Massachusetts*: Barnstable Co.; Berkshire Co.; Essex Co.; Hampden Co.; Hampshire Co.; Middlesex Co.; Suffolk Co.; Worcester Co. *Michigan*: Berrien Co.; Cheboygan Co.; Clinton Co.; Ingham Co.; Livingston Co.; Wayne Co. *Minnesota*: Aitkin Co.; Clay Co.; Dakota Co.; Dodge Co.; Fillmore Co.; Goodhue Co.; Hennepin Co.; Houston Co.; Itasca Co.; Lac Qui Parle Co.; Lyon Co.; Olmstead Co.; Pine Co.; Pipestone Co.; Polk Co.; Ramsey Co.; Roseau Co.; Winona Co. *Mississippi*: Lafayette Co. *Missouri*: Boone Co.; Wayne Co. *Nebraska*: Antelope Co.; Cuming Co. *New Hampshire*: Grafton Co.; Sullivan Co. *New Jersey*: Bergen Co.; Burlington Co.; Essex Co.; Hunterdon Co.; Somerset Co. *New York*: Broome Co.; Cayuga Co.; Clinton Co.; Herkimer Co.; Jefferson Co.; Lewis Co.; Madison Co.; Monroe Co.; Nassau Co.; Ontario Co.; Otsego Co.; Seneca Co.; Steuben Co.; Sullivan Co.; Tioga Co.; Tompkins Co.; Westchester Co.; Wyoming Co. *North*

*Carolina*: Buncombe Co.; Graham Co.; Haywood Co.; Macon Co.; Mitchell Co.; Wake Co.; Watauga Co. *North Dakota*: Cass Co. *Ohio*: Champaign Co.; Erie Co.; Franklin Co.; Greene Co.; Hocking Co.; Lawrence Co.; Logan Co.; Medina Co.; Pickaway Co.; Seneca Co.; Summit Co.; Wayne Co. *Pennsylvania*: Allegheny Co.; Bedford Co.; Bucks Co.; Centre Co.; Dauphin Co.; Delaware Co.; Huntingdon Co.; Philadelphia Co.; Westmoreland Co. *Rhode Island*: Richmond. *South Dakota*: Grant Co. *Tennessee*: Anderson Co.; Union Co. *Vermont*: Orleans Co.; Rutland Co.; Windham Co.; Windsor Co. *Virginia*: Fairfax Co.; Giles Co.; Montgomery Co.; Prince George Co.; Shenandoah Co. *West Virginia*: Preston Co. *Wisconsin*: Dane Co.; Polk Co.; Rusk Co.

*Flight Period.* Collection dates range from 20 April to 1 September. Most specimens have been collected in June and July, with a fair number in August and May. This species seems to have a fairly long flight period even in one region, since I have seen almost the entire range of collection dates from specimens collected at a single locality.

*Biology.* The larvae of *Allognosta fuscitarsis* evidently live in decaying organic matter (McFadden, 1967). During a study of reclaimed strip mine areas in Ohio, large numbers of larvae were collected in Berlese samples (Triplehorn, personal communication). The record of *A. fuscitarsis* larvae from stems of aquatic plants (McFadden, 1972) seems unusual. One adult specimen from Maryland was annotated "reared-horse manure." Adults have been taken at light, by sweeping, and in Malaise traps. They have been taken from quite a few different plants; labels indicate collections from: alfalfa (New York, Georgia), *Barbarea vulgaris* (Massachusetts), bluegrass (Minnesota), *Catalpa* leaves (North Carolina), elm (New Jersey), *Eupatorium maculatum* (New York), and vetch (Tennessee). The record of *A. fuscitarsis*

taken on *Kalmia* (McFadden, 1972) is erroneous; the specimen referred to was actually *Allognosta brevicornis*. Male specimens from New York were examined that had a label that indicated they were collected from conspecific swarms. It seems probable that all members of the genus have this behavior.

**Remarks.** *Allognosta fuscitarsis* is the most common member of the genus in North America, and is present in most collections. Malaise traps have turned up rather long series in a single day, also attesting to the commonness of the species.

The species has previously been characterized by the pale color of the middle portions of the abdominal tergites. This has been found to be quite variable in females, which has led to some previous misidentifications. I have seen series collected on the same day from the same locality which exhibit a range of variation from totally dark brown to rather extensively pale. The species is much more easily identified reliably by the shape of the antennae, the bare area on the mesopleuron, and the genitalia of both sexes. Males are less variable, and I have not seen specimens with totally brown abdomens. However, I have seen specimens of *A. obscuriventris* (Loew) with extensively pale tergites, which could lead to their being confused with this species. *Allognosta fuscitarsis* is evidently quite closely related to the Japanese *A. flavimaculata* Nagatomi and Tanaka. The latter species also has pale medial areas on the tergites (which are variable according to Nagatomi and Tanaka, 1969), and the male genitalia are extremely similar in the two species. I initially thought they might be conspecific, but I subsequently examined a female paratype from the United States National Museum of Natural History, through the kindness of Willis Wirth. The female genitalia are quite different, and the species is larger, has darker legs, a dark first antennal segment, and no bare area on the mesopleuron.

### *Allognosta obscuriventris* (Loew)

*Metoponia obscuriventris* Loew, 1863: 299.

*Metoponia similis* Loew, 1863: 299. NEW SYNONYMY.

**Type Material.** The female type of *Metoponia obscuriventris*, from "D.C.," is housed in the Museum of Comparative Zoology (MCZ 12535), and is in perfect condition.

There are two specimens labeled as types of *Metoponia similis* Loew, also in the Museum of Comparative Zoology (MCZ 12534). One specimen bears Loew's handwritten label "similis, m.," and the other bears a label "New York, Schaum," the type locality and collector included in Loew's original description. There is no indication in the original description as to how many specimens Loew saw. Both of the above specimens are males, the only sex which Loew described. One specimen has bluish reflections on the mesonotum, a primary character used by Loew to characterize *M. similis*, and I hereby designate it as lectotype. It is labeled "Loew Coll./ similis, m./ Type 2 12534/ LECTOTYPE *Metoponia similis* Loew, 1863 des. N. E. Woodley, 1979/ *Allognosta obscuriventris* (Loew) det. Woodley 1980." The third antennal segments are missing, and the left wing is somewhat crumpled, but it is otherwise in good condition. I am designating the other specimen as paralectotype, and it is labeled "New York, Schaum/ Loew Coll./ Type 12534/ PARALECTOTYPE *Metoponia similis* Loew, 1863 des. N. E. Woodley 1979/ *Allognosta fuscitarsis* (Say) det. Woodley 1978." The entire head and left front leg are missing from the specimen.

**Diagnosis.** Male specimens of *Allognosta obscuriventris* (Loew) are best identified by the shape of the genitalia, particularly the long but shallowly emarginate medial process of the ventral bridge of the gonocoxites (Fig. 28), and the large gonostyli which are somewhat expanded apically, and sharply pointed.

Females are best identified by their dark pleura and the wholly pollinose ventral portion of the mesopleuron. Other diagnostic characters include the elongate antennal flagellum with the first flagellomere being short (Fig. 5), the rather poorly contrasting stigmal area of the wing, and the long and usually dark facial hairs.

*Description. Male.* Head black, frons with small medial longitudinal groove; ocellar tubercle slightly prominent; frons and face strongly grayish white pollinose, rest of head much more thinly pollinose; vertex, frons, face, and genal regions pilose, pile of face about 1.5 times as long as first antennal segment, longer on genae, mostly brownish but some pale hairs usually present on genae; eyes with extremely short, sparse hairs; antennae about 0.7 times length of head, dark brown with apex of second segment and first and second flagellomeres yellow, sometimes first and second antennal segments wholly yellow; first flagellomere shorter than the following three combined; longer hairs of antennae black; palpi with first segment yellowish to black, second velvety black, both segments with a mixture of pale and dark hairs; proboscis yellowish. Thorax with mesonotum shiny black, often with somewhat bluish or greenish metallic reflections, densely punctate; humeri light to dark brown, postalar calli brownish to yellowish; pleura concolorous with mesonotum, except that area below wing base is more brownish; pleura pollinose except for bare areas on extreme dorsal and posterior part of mesopleuron, entire sternopleuron except for a dorsal band, and entire pteropleuron and metapleuron; thoracic pile erect, long and pale, a few darker hairs sometimes present on mesonotum; legs with coxae yellowish to brown; remainder brownish with yellow coloration on apical one-fifth of front femora, extreme apices of middle and hind femora, basal one-third of front tibiae, extreme bases of middle and hind tibiae,

basal two tarsomeres of middle legs, and basal three tarsomeres of hind legs; ranging in some specimens to more extensively yellow, only faint medial portions of hind femora and most of hind tibiae brownish, with tarsomeres colored as above except for yellowish bases of front basal tarsomeres; wings very slightly infuscated anteriorly, decreasing posteriorly, stigma distinct but weakly contrasting with wing membrane; halter yellowish brown to dark brown. Abdomen ranging from yellowish, except for lateral margins of tergites and sternites one to five and segments posterior to five brown, to totally brownish, the latter condition being found in most specimens; abdomen thinly pollinose (less so ventrally), except along dorsolateral margins, with first abdominal segment rather strongly pollinose both dorsally and ventrally; pilosity short and sparse both dorsally and ventrally, longest along lateral margins; hypopygium becoming yellowish on gonostyli and cerci; genitalia (Figs. 24–28) with median process of ventral bridge of gonocoxites produced, shallowly emarginate (Fig. 28); gonostyli expanded apically, sharply pointed; aedeagal complex (Figs. 25, 26) with lateral valves apically reflexed, slightly longer than aedeagus. Length 4.1 to 5.7 mm.

*Female.* Differs from male as follows: head brownish to black, frons 0.31 to 0.44 width of head, margins parallel to slightly convergent toward antennae; frons separated into two portions by a transverse sulcus which is obsolete medially; a longitudinal groove separates the lower frons into two halves, each of which is surrounded by a border of silvery gray pollinosity, medial portions impunctate and shiny to sparsely pubescent with very short hairs, and slightly convex; upper frons rather evenly punctate, with a vaguely defined medial depression which may extend longitudinally almost the length of the frons; upper frons clothed with short, pale hairs subequal in length to the first antennal segment; face silvery



gray pollinose; ocelli vaguely prominent; occipital margin rather sharp; vertex pollinose except lateral to ocelli, and above and posterior to the middle of the eye. Thorax with hairs shorter than in male. Abdomen sometimes a little less densely pollinose than in male; genitalia (Figs. 29, 30) with median aperture of furca pointed anteriorly, large; anterolateral margins ranging from nearly straight to strongly emarginate. Length 4.0 to 5.4 mm.

*Distribution* (Map 3). Southern Manitoba east to southern Quebec, south through Kansas, Mississippi, to Florida. A record from Colorado needs substantiation.

*Locality Records* (194 males, 206 females). CANADA: *Manitoba*: 5 mi. SW of Shilo. *Ontario*: Black Rapids; Cayuga; Chatham; Crozier; Eagle River; Emo; Jock River; Leamington; Marmora; Mer Bleu, 5 mi. E of Ottawa; Pt. Pelee; 10 mi. SE of Renfrew; Stittsville; Tillsonburg; Vernon. *Quebec*: Abbotsford; Aylmer; Fabre; Fairy Lake; Harrington Lake, Gattineau Park; Kazabazua; Knowlton; Laniel; Montreal; Old Chelsea. UNITED STATES: *Colorado*: Boulder Co., Valmont Butte, 5300 ft. *Connecticut*: Hartford Co.; Litchfield Co. *District of Columbia*: Washington. *Florida*: Alachua Co.; Calhoun Co.; DeSoto Co.; Highlands Co.; Marion Co.; Orange Co.; Pinellas Co.; Polk Co. *Georgia*: Clarke Co.; Fulton Co.; Liberty Co.; Lynn Co.; Rabun Co. *Illinois*: Kappa; LaRue; Spring Grove; Champaign Co.; Cook Co.; Jo Daviess Co.; Lake Co.; McHenry Co.; McLean Co.; Macoupin Co.; Peoria Co.; Union Co.; Vermilion Co. *Indiana*: Tippecanoe Co.; Wells Co. *Iowa*: Camp Dodge; Boone Co.; Story Co. *Kansas*: Miami Co.; Pottawatomie Co. *Kentucky*: Breathitt Co.; Fayette Co. *Maryland*: Prince Georges Co. *Massachusetts*: Sherborn; Essex Co.; Hampden Co.; Middlesex Co.; Norfolk Co. *Michigan*: Branch Co.; Clinton Co.; Eaton Co.; Gladwin Co.; Ingham Co.; Ionia Co.;

Livingston Co.; Midland Co.; St. Clair Co.; Wayne Co. *Minnesota*: Carver Co.; Clay Co.; Fillmore Co.; Goodhue Co.; Hennepin Co.; Houston Co.; Mille Lacs Co.; Nicollet Co.; Olmstead Co.; Pine Co.; Pipestone Co.; Ramsey Co. *Mississippi*: Lafayette Co. *Missouri*: Callaway Co. *Nebraska*: Antelope Co. *New Hampshire*: Grafton Co. *New Jersey*: Burlington Co.; Camden Co.; Gloucester Co. *New York*: Erie Co.; Greene Co.; Herkimer Co.; Steuben Co.; Tompkins Co. *North Carolina*: Graham Co.; Johnston Co.; Pender Co.; Wake Co. *Ohio*: Butler Co.; Clinton Co.; Delaware Co.; Erie Co.; Franklin Co.; Greene Co.; Tuscarawas Co. *Pennsylvania*: Cumberland Co.; Dauphin Co.; Lancaster Co.; Philadelphia Co. *Tennessee*: Hamilton Co.; Montgomery Co.; Sevier Co.; Shelby Co. *Virginia*: Chain Bridge; Maywood; Chesterfield Co.; Fairfax Co.; Giles Co.; Montgomery Co.; Shenandoah Co. *Wisconsin*: Dane Co.; Pierce Co.; Polk Co.; Sauk Co.

*Flight Period*. Specimens have been collected on dates ranging from 15 February (Florida) to 11 August. Collection dates, even from northern areas of the range, predominate in May and June, with only a few records from July and August. More southern regions have collection dates predominating in March and April, tapering off in May.

*Biology*. The immature stages of this species are not known. Adults have been collected in Malaise traps and by sweeping vegetation. Plants from which specimens have been collected include *Abies balsamea* (Ontario), alfalfa (Minnesota), raspberries (New York), and *Viburnum edulae* (Manitoba).

*Remarks*. This species is less common than *A. fuscitarsis*, but not nearly as rare as *A. brevicornis*. The identity of the species has not been well established in the past, due to the variable nature of its color. Specimens with metallic reflections on the mesonotum and pale medial areas on the abdominal tergites have

been known as *A. similis* (Loew). The lectotype specimen is evidently teneral, and specimens with this paler coloration may well be freshly emerged, and may darken with age. Variation in the abdominal coloration is prevalent in females of *A. fuscitarsis*, and dark specimens have been misidentified as *A. obscuriventris*. The mesopleural pollinosity is a much more reliable character for the separation of *A. obscuriventris* from *A. fuscitarsis*, as noted in the diagnosis for each species. Some variation has also been noted in the genitalia of both sexes, but particularly in the females. The male gonostyli vary to some degree in size; the range is shown in Figures 27 and 28. The usual size is nearer to the larger example. The overall width of the genital capsule is somewhat variable, as is the length of the space between the gonocoxal apodemes and the main part of the gonocoxites. The overall form of the genitalia is distinctive however, and I have examined a fair number of individuals in the course of determining the status of *A. similis*. I have no reason to suspect that more than one species is involved. The female genital furca is also variable. In particular, the anterolateral margins of the sternite are variable, ranging from nearly straight to deeply emarginate. The most constant feature seems to be the shape of the median aperture, which is pointed anteriorly. However, the one female specimen examined from Colorado has the aperture with the anterior margin rather straight, as in *A. fuscitarsis*. More material needs to be collected from this region before this variant can be interpreted properly. I have figured two specimens with female genitalia representing the extremes observed (Figs. 29, 30). A more extensive study may indicate that the female genitalia of this species are more variable than presently believed, and are not useful for separating *A. obscuriventris* from *A. fuscitarsis* in every case. They seem to be reliable in most cases, however, and corroborate other characters that have

proved to be useful in separating these two taxa.

### Genus *BERIS* Latreille

*Beris* Latreille, 1802: 447; type species *Stratiomys sexdentata* Fabricius (= *Musca chalybata* Forster), by monotypy.

*Hemiberis* Enderlein, 1921: 209; type species *Beris quadridentata* Walker (= *Beris fuscipes* Meigen), by original designation. NEW SYNONYMY.

**Diagnosis.** Members of the genus *Beris* may be distinguished from all other North American Beridinae by their extremely small, one-segmented maxillary palpi. Other generic features include medium size with elongate body form, and rather uniformly distributed pilosity; eyes pilose in both sexes; males holoptic; females dichoptic, with wide frons with nearly parallel margins; antennal flagellum more or less conical, usually eight-segmented (seven in *B. strobli*); oral margin somewhat produced ventrally; thorax metallic greenish in Nearctic species; scutellum usually with six spines, sometimes eight, progressively smaller laterally, sometimes irregular; legs with hind pair elongate, the basitarsus of hind leg inflated in male; middle tibiae without apical spur; wings with  $R_4$  present,  $R_{2+3}$  arising basal to r-m,  $M_1$  and  $M_2$  sometimes petiolate to separate at discal cell,  $M_3$  absent; abdomen brownish, tergites two to six with preapical transverse grooves, that of tergite six faint.

The new synonymy of *Hemiberis* Enderlein with *Beris* rather than with *Actina* is based upon the lectotype designation for *Beris quadridentata* Walker, which is discussed below.

The Nearctic species of *Beris* have remained rather poorly understood until now. The genitalia of both sexes, which offer the best diagnostic characters, have not been previously examined in detail nor figured for our species. I examined these structures, and they have indicated the presence of a third species never before recorded from North America, and one synonymy with a Palaearctic species.

In addition, examination of the holotypes has revealed one further synonymy. Thus there are three Nearctic taxa known at present, two of which are also widely distributed in the Palearctic Region. The genus as a whole is more diverse in the Old World, being found in the Palearctic and northern Oriental Regions. Species referred to *Beris* in the Southern Hemisphere belong in other genera. Despite examination of numerous Beridinae from the Southern Hemisphere, I have never seen specimens which are congeneric with true *Beris*, which is apparently restricted to the Northern Hemisphere. Most of the southern species have only four scutellar spines and all have well-developed two-segmented palpi.

The life histories of the North American species are poorly known. The larvae have never been collected (or at least associated with adults), and the only knowledge of the immature stages for our species is based upon European work. Males probably form conspecific swarms, for this behavior has been recorded anecdotally for British species (Verrall, 1909). Males have large, holoptic eyes and larger ommatidia dorsally, although they are not clearly divided from the smaller, lower ones. This is commonly believed to be an adaptation coupled with swarming behavior (McAlpine and Monroe, 1968; Downes, 1969). The enlarged hind basitarsus of male *Beris* may also function in some connection either with swarming or associated mating behavior.

#### KEY TO THE NEARCTIC SPECIES OF *BERIS*

1. Males (holoptic) ..... 2  
Females (dichoptic) ..... 4
2. Tenth tergite with posterolateral surstyli (Fig. 33); aedeagus long, arcuate, the aedeagal valves subequal in length to the aedeagus (Fig. 34); posteromedial area of ventral bridge of gonocoxites feebly produced (Fig. 36) ..... *fuscipes* Meigen
- Tenth tergite truncate posteriorly, without surstyli (Figs. 37, 41); aedeagal valves either longer or shorter than the aedeagus itself (Figs. 38, 42) ..... 3

3. Antennal flagellum seven-segmented (Fig. 9); medial region of ventral bridge of gonocoxites strongly produced (Fig. 44); aedeagus much shorter than aedeagal valves (Fig. 42) ..... *strobli* Dušek & Rozkošný
- Antennal flagellum long, eight-segmented (Fig. 7); medial region of ventral bridge of gonocoxites feebly produced (Fig. 40); aedeagus longer than aedeagal valves (Fig. 38) ..... *luteipes* Johnson
4. Antennal flagellum eight-segmented (Figs. 6, 8); spermathecal ducts sclerotized posteriorly (Figs. 45, 46); median aperture of ninth sternite reduced, very small, most of furca sclerotized ..... 5
- Antennal flagellum seven-segmented (Fig. 9); spermathecal ducts unsclerotized posteriorly (thus not shown in Fig. 47); median aperture of ninth sternite large, encompassing most of that surface ..... *strobli* Dušek & Rozkošný
5. Antennal flagellum quite conical, tapering sharply toward apex (Fig. 6); sclerotized portion of spermathecal ducts very long, twice as long as the rest of the genital segment (Fig. 45); median hind margin of furca posterior to median aperture bilobed; widespread in mountainous and boreal regions except on the Pacific coast ..... *fuscipes* Meigen
- Antennal flagellum usually long, tapering more gradually toward apex (Fig. 8); sclerotized portion of spermathecal ducts shorter, only slightly longer than the rest of the genital segment (Fig. 46); median hind margin of furca posterior to median aperture truncate; found in British Columbia, Alberta, Washington, Oregon, California, western Nevada, Idaho, and possibly Wyoming ..... *luteipes* Johnson

#### *Beris fuscipes* Meigen

- Beris fuscipes* Meigen, 1820: 8.  
*Beris brevicornis* Heyden in Loew, 1846: 284.  
*Beris quadridentata* Walker, 1848: 127. NEW SYN-ONYMY.  
*Oplacantha annulifera* Bigot, 1887: 21. NEW SYN-ONYMY.  
*Actina canadensis* Cresson, 1919: 174.  
*Beris annulifera* var. *brunnipes* Johnson, 1926b: 109.  
*Beris sachalinensis* Pleske, 1926: 408.  
*Beris fuscotibialis* Pleske, 1926: 409.  
*Beris sychuanensis* Pleske, 1926: 411.  
*Beris mongolica* Pleske, 1926: 414.  
*Beris petiolata* Frey, 1960: 80.

**Type Material.** The type of *Beris fuscipes* Meigen is housed in the Museum



National d'Histoire Naturelle, Paris. It was not available for study.

Loew (1846) first used the name *Beris brevicornis* in connection with specimens sent to him by "Hr. v. Heyden." Loew obviously used the name as a synonym of *B. fuscipes*. It is apparently only a manuscript name, never having been formally proposed; thus no type material exists.

Two syntypes of Walker's *Beris quadridentata* are housed in the British Museum. The male is probably conspecific with *Actina viridis* (Say), but is badly damaged. Thus I hereby designate the female specimen as lectotype, which bears the following labels: "♀ Type/*Beris quadridentata*, ♀. Walker. (Type). = *B. viridis*, Say (O.S.)./ one of Walkers series so named EAW; [verso reads] *Beris quadridentata* Walk./ LECTOTYPE *Beris quadridentata* Walker 1848: 127 des. N. E. Woodley 1980/ *Beris fuscipes* Meigen det. Woodley 1980." The specimen lacks the right antennal flagellum, the distal portion of the fifth tarsomere of the right front leg, the left middle leg, and the fifth tarsomere of the right hind leg, but is otherwise in good condition. The male specimen is designated as paralectotype, and bears identical labels except that on the first two labels "♂" replaces "♀," and the fifth label reads "*Actina viridis* (Say) det. Woodley 1980."

The female syntypes of *Oplacantha annulifera* Bigot are also presently housed in the British Museum. I hereby designate one as lectotype, which bears the labels "Opl. annulifera Big. Col. Big/ *Octacantha* [sic] annulifera Big. AMERICA ex Bigot Coll: BM 1960-539./ LECTOTYPE *Oplacantha annulifera* Bigot 1887 des. N. E. Woodley 1979/ *Beris fuscipes* Meigen det. Woodley 1979." The specimen lacks the left middle leg, the right hind leg, and the second segment of the right cercus. The second specimen that I examined, with labels identical to those of the lectotype, is hereby designated as paralectotype, and is labeled accordingly. It is conspecific with the lectotype.

The female holotype of *Actina canadensis* Cresson is housed in the Academy of Natural Sciences, Philadelphia, Pennsylvania. It is labeled as Type 6252, contrary to the published number of 6196. The specimen lacks the right front leg, but is otherwise in good condition.

The male holotype of *Beris annulifera* var. *brunnipes* Johnson is in the Museum of Comparative Zoology (MCZ 7494). It lacks the right antennal flagellum, but is otherwise in excellent condition.

**Diagnosis.** Males of *Beris fuscipes* Meigen may be readily recognized by the presence of posterolateral surstyli (Fig. 33) on the tenth tergite, which may or may not be curved. This character is easily visible without dissection. Females are readily recognized by their terminalia with the posterior portions of the spermathecal ducts being long and sclerotized, and the medial region of the ninth sternite posterior to the small median aperture bilobed. Both sexes have antennae with a moderately short, conical flagellum which is wide basally and which tapers strongly toward the apex (Fig. 6). The maxillary palpi, although very small as in all *Beris*, are larger in this species than in other North American forms. The differences are slight, however, and are difficult to appreciate without comparison with the other two species.

**Description. Male.** Head black, frons and face shiny, upper occiput pollinose; entire head including eyes pilose, color of pile variable, ranging from mostly pale with scattered dark hairs to almost wholly dark, usually a mixture of both; hairs at oral margin subequal in length to the first two antennal segments combined, those above antennae subequal to the length of the first segment; antennae black, very rarely with inner portion of first flagellomere yellowish, shorter than length of head; first two segments subequal, the second tapering to about twice width of base at apex; flagellum 1.3 to 1.7 times length of first two segments combined, basal width wider than apex of second segment, tapering strongly to a rather

sharp apex, slightly concave on inner surface; pile of antennae black; proboscis yellow; palpi minute, elongate oval; ocelli yellowish, ocellar tubercle slightly prominent. Thorax with mesonotum shiny green, often with bluish reflections, sometimes medial portion of mesonotum and scutellum bluish, very rarely brassy green; scutellum normally with six spines; pleura brownish black, upper portions with greenish reflections; thoracic pile mostly pale, sometimes with scattered dark hairs on mesonotum, length on mesonotum subequal to first two antennal segments combined; legs with front and hind coxae brownish black, middle coxae yellowish, occasionally dark; rest of legs yellowish except front and middle legs with apical halves of basitarsi and entire tarsomeres two to five dark brown, and hind legs with brownish subapical region on femora, tibiae and basitarsi slightly brownish, apical four tarsomeres dark brown; ranging in darker specimens to wholly brown except for yellowish extreme apices of all femora, basal one-thirds of front and middle tibiae, and extreme bases of hind tibiae, also bases of hind femora evanescently yellowish; wings brownish, evenly set with microtrichia, stigma darker; halter pale yellow with darker stem. Abdomen brown, evenly pollinose dorsally except for lateral margins, becoming less pollinose on apical tergites, ventrally shiny; pile pale, longest laterally; genitalia (Figs. 33–36) with gonostyli ovate, not arcuate, often yellowish; medial process of ventral bridge of gonocoxites feebly produced, truncate (Fig. 36); aedeagal complex (Figs. 34, 35) very long, strongly arcuate, lateral valves subequal in length to aedeagus; tenth tergite (Fig. 33) with well-developed surstyli, straight or curved; cerci yellowish. Length 5.0 to 6.9 mm.

*Female.* Differs from male as follows: head with frons and face brownish black to black; frons 0.23 to 0.35 width of head at anterior ocellus, finely punctate, occasionally with faint longitudinal striae be-

low ocelli; a small circular depression present above antennae; pile of head pale, that of face shorter than length of first antennal segment; antennae brownish black to black, with inner portions of flagellomeres two to four slightly yellowish, ranging in pale specimens to apical portions of first and second segments, entire first and second flagellomeres, and inner portions of flagellomeres three to six yellow; pile of first two antennal segments ranging from mostly dark to mostly pale. Thorax with pale pile, shorter than in male; legs wholly yellow except for front and hind coxae, extreme apices of all basitarsi, and entire tarsomeres two to five of all legs brownish; ranging to as dark as in darkest males, except that extreme bases of all femora and all basitarsi are yellowish. Abdomen with entire first tergite, basal half of second tergite, and extreme bases of tergites three to five pollinose, remainder shiny; pile pale, shorter than in male; genitalia (Fig. 45) with sclerotized posterior portions of spermathecal ducts very long, twice as long as the genital segment itself; median aperture of genital sternite small; medial hind margin of genital sternite posterior to median aperture bilobed; cerci yellowish, first segment slightly thicker than second. Length 4.7 to 6.9 mm.

*Distribution* (Map 5 shows Nearctic portion). Holarctic; ranging from Great Britain east to Japan in the Palaearctic Region, and in the Nearctic Region essentially montane and boreal, from Alaska south through the Rocky Mountains to southern Arizona and New Mexico; from British Columbia east across the northern United States and Canada to Labrador, Maine, south to Tennessee.

*Locality Records* (190 males, 262 females). UNITED STATES, ALASKA: Anchorage; Big Delta; Brooks Lake; Curry; Eagle River; Independence Mine; Kenai Peninsula, 15 mi. SE of Anchorage; Salcha River, Alaska Highway mile 1481; Seward; Shaw Creek, Richardson Highway mile 289. CANADA: *Alberta:*

Athabasca; Banff; Bilby; Blairmore; Cooking Lake, near Edmonton; Edmonton; Gorge Creek; Gull Lake; Jumping Pond Creek, 20 mi. W of Calgary; Kananaskis; McMurray; 8 mi. E of Morley; Nordegg; Opal; Pincher; Seebe; Wabamun; Waterton. *British Columbia*: Canim Lake; Ground Hog Basin, Selkirk Mountains; Liard Hot Springs, Alaska Highway mile 496, 1500 ft.; Nass River, Aiyansh; Salmon Arm; 6 mi. W of Terrace; *Hudson Bay Territory*: no further data. *Labrador*: Parroquet Island; Straights of Belle Isle. *Manitoba*: Minnitonas; Ninette; 5 mi. SW of Shilo. *Newfoundland*: Mtns. E of Codroy; St. Anthony; Stephenville. *Ontario*: Britannia; Finland; Kearny; Low Bush, Lake Abitibi; Macdiarmid, Lake Nipigon; Maynooth; Normandale; One Sided Lake; Ottawa; Simcoe; Thornhill; Vermilion Bay. *Quebec*: Bradore Bay; Duncan Lake, near Rupert; Forestville; Gaspé; Hull; Knob Lake, 54°47', 66°47'; Laniel; Megantic; Mistassini; Old Chelsea; Rupert House. *Saskatchewan*: Kenosee. *Yukon*: Dawson; 14 mi. E of Dawson, 1500 ft.; Dempster Highway mile 87; Sheldon Lake, 131°37', 62°56', 3500 ft. UNITED STATES: *Arizona*: Colter's Ranch, White Mts.; Graham Co. *Colorado*: Blackhawk; Buckhorn Creek; Green Mt. Falls, 8000 ft.; Sierra Blanca, 11,500 ft.; Costilla Co.; Grand Co.; Gunnison Co.; Larimer Co.; Rio Grande Co.; Teller Co. *Idaho*: Latah Co. *Maine*: Penobscot Co. *Michigan*: Cheboygan Co.; Chipewa Co. *Minnesota*: Anoka Co.; Clearwater Co.; Cook Co.; Lake Co.; Pope Co.; Ramsey Co. *Montana*: Avalanche Lake, Glacier Park; Gallatin Co.; Missoula Co. *New Hampshire*: Pinkham Notch; White Mts.; Carroll Co.; Coos Co. *New Mexico*: Therma; Otero Co.; Sandoval Co.; Taos Co. *New York*: Essex Co.; Greene Co. *Oregon*: Baker Co. *Tennessee*: Indian Gap, 5200 ft.; Great Smoky Mountains National Park; Sevier Co. *Utah*: Cache Co.; Grand Co.; Uintah Co. *Vermont*: Caledonia Co. *Washington*: Columbia Co.

*Wisconsin*: Florence Co.; Vilas Co. *Wyoming*: Albany Co.

*Flight Period*. Collection dates range from 12 May to 11 August. Almost all specimens were collected in June and July.

*Biology*. The larva of *Beris fuscipes* was briefly described by Lenz (1923), and was collected under bark. Larvae have not been collected in North America to my knowledge. Adults apparently occur in situations similar to those of other species. I have seen series of *B. fuscipes* and *B. strobli* collected at the same locality on the same date. Specimens have been taken by sweeping, in Malaise traps, and at light. One label also reads "in marsh clearing" (British Columbia). Records attributed to this species referring to their being collected on flowers (McFadden, 1972) actually refer to *B. luteipes*. Males probably form conspecific swarms, for reasons discussed above.

*Remarks*. I have been unable to examine the type of *Beris fuscipes*. It was apparently last examined by Verrall (1909), who stated that the specimen was a male. It needs to be reexamined, however, particularly with reference to the genitalia. I have also not examined the various types for synonyms based on Palaearctic material, for these have been adequately treated by Rozkošný (1973) and Nartshuk and Rozkošný (1975, 1976), who have cleared up much of the synonymy that has accumulated for the Palaearctic species. These workers have also provided figures of the male genitalia which have proved very useful in determining the status of the Nearctic species of *Beris*.

*Beris fuscipes* has long been called *B. annulifera* in North America. The work cited in the previous paragraph led me to discover the synonymy of this name with *B. fuscipes*. I examined European specimens of the species and determined that our material was conspecific, and confirmed the synonymy by examining the original Bigot type material. The types



were stated as being from Georgia, but labels on the specimens indicate only "America," and I have not seen modern material from Georgia, although it may occur in the northern part of the state.

I have also examined the type material for *Beris quadridentata* Walker. The male specimen, upon which previous synonymy with *Actina viridis* (Say) has been based, is badly damaged. I therefore have designated the female, which is in much better condition, as lectotype. It is conspecific with *Beris fuscipes* (Walker states that the female has six scutellar spines, indicating a *Beris*, and I have examined the terminalia to confirm the identity of the lectotype). This has resulted in two changes in synonymy. The genus *Hemiberis* Enderlein, which was based upon *B. quadridentata* as type species, becomes a junior synonym of *Beris* rather than of *Actina* as it has been in the past. And *Beris quadridentata* becomes a synonym of *B. fuscipes*. Because the lectotype designation does not affect any name presently in use, and is very unlikely to do so in the future, I felt it was more advisable to designate a specimen as lectotype that could be positively identified. The damaged male lacks most of the abdomen, including the genitalia. Thus, if another species of *Actina* is discovered in the future from the Nearctic Region, it would be difficult to determine the identity of *B. quadridentata* if the male was the lectotype, even though at present it can be assigned to *Actina viridis* (simply because there is only one Nearctic *Actina*). Therefore, I feel the above solution is most likely to result in future stability of all names concerned.

The female type of *Actina canadensis* Cresson was also examined, and I concur with McFadden (1972), who synonymized it with *B. annulifera*, that it is not specifically distinct. I likewise could not detect the "steel blue vittae" first reported by Curran (1927). I also agree with McFadden that *Beris annulifera* var. *brunnipes* Johnson is merely a variant

not warranting subspecific recognition, and I have confirmed that synonymy by examining the holotype.

*Beris fuscipes* is the most widespread species of the genus in the Nearctic Region, being found in boreal and mountainous regions across the continent. It is fairly variable, particularly with respect to leg coloration. The coloration of the legs was briefly studied by McFadden (1972), who determined that it did not vary in any way distinctly correlated with geographical regions. It is interesting to note that two paratypes, one each of *B. annulifera* var. *luteipes* and *B. a.* var. *brunnipes*, were collected from the same locality in New Hampshire. Thus it is not feasible to maintain subspecific taxa for this species.

There has been some variation detected in the shape and size of the male tenth tergite. In some specimens, particularly from Washington and Idaho, the tergite is small and the surstyli are quite straight, rather than being curved as in most specimens. These variations are minor however, and other features of the male genitalia are quite constant and distinctive.

The female terminalia were illustrated by Nagatomi and Iwata (1978). The preparation was not dissected, however, so that the structures of the genital furca are not well depicted. These structures are quite diagnostic for the species of *Beris* in North America, and are illustrated here for the first time.

### *Beris luteipes* Johnson

*Beris annulifera* var. *luteipes* Johnson, 1926b: 109.  
NEW STATUS.

*Beris californica* James, 1939: 546. NEW SYNONYMY.

**Type Material.** The holotype of *Beris annulifera* var. *luteipes* Johnson, from Seattle, Washington, is presently housed in the Museum of Comparative Zoology (MCZ 7493). The specimen is a male, and is lacking both third antennal segments, the left middle leg, both hind

legs, and most of the left wing. The female allotype is conspecific, and is also from Seattle. All of the paratypes are *Beris fuscipes* Meigen.

The holotype of *Beris californica* James, from Del Norte Co., California, is presently housed in the collection of the Abteilung Taxonomie der Insekten des Institutes für Pflanzenschutzforschung der Akademie der Landwirtschaftswissenschaften der DDR, Eberswalde, East Germany. The male specimen is missing the left middle leg, but is otherwise in excellent condition.

*Diagnosis.* Males may be separated from other species of *Beris* occurring in North America by their genitalia, especially the combination of the truncate tenth tergite (Fig. 37), the long aedeagus (Figs. 38, 39), and the feebly produced process of the ventral bridge of the gonocoxites (Fig. 40); females may be recognized by their short but sclerotized posterior portions of the spermathecal ducts, which are only about as long as the ninth sternite, the truncate medial hind margin of the genital sternite posterior to the small median aperture (Fig. 46), and the elongate, slender antennal flagellum (Fig. 8). In much of its range it is the only species of *Beris*.

*Description. Male.* Head black, frons and face shiny, upper portion of occiput pollinose, entire head including eyes pilose; pile black, occasionally with intermixed pale hairs below antennae; hairs at oral margin subequal to, to considerably longer than, the first two antennal segments combined, those above antennae subequal to the first antennal segment, occasionally slightly longer; antennae black, occasionally with extreme apex of second segment, and inner portions of flagellomeres one to five yellowish; length ranging from shorter than the length of head to subequal to it, first two segments subequal, second widened apically; flagellum long and slender, 1.8 to 2.2 times length of the first two segments combined (Fig. 7), base subequal in

width to the second segment, occasionally slightly wider; longer pile of antennae black; proboscis yellow; palpi minute, elongate-oval; ocelli yellow, ocellar tubercle somewhat prominent. Thorax with mesonotum shiny metallic green to blackish green, sometimes with brassy reflections; pleura blackish, dark brownish below wing base, often with greenish reflections, particularly on mesopleuron and sternopleuron; scutellum concolorous with mesonotum, normally with six spines; pile ranging from dark with a few scattered pale hairs to entirely pale, about length of first two antennal segments combined, to somewhat longer; legs with front and hind coxae blackish, middle coxae mostly yellowish; rest of legs wholly yellow except for brownish black coloration on apical third of basitarsi and entire tarsomeres two to five of front and middle legs, and last four tarsomeres of hind legs; ranging in some specimens to yellow except for wholly brownish apices of front and middle femora, hind femora entirely brownish, darker at apices, front and middle tibiae brown except for basal one-thirds, hind tibiae dark brown except for basal one-fifths, and all tarsi wholly brown; wings brownish, stigma darker, evenly set with microtrichia; halter ranging from wholly yellowish to wholly brownish. Abdomen brown to blackish brown, dorsally subshining, evenly and finely pollinose, ventrally shiny; pile ranging from wholly pale to blackish dorsally and laterally, the remainder pale, longest laterally; genitalia concolorous with abdomen, but often with gonostyli and cerci yellowish; gonostyli ovate, not strongly arcuate; posteromedial region of ventral bridge of gonocoxites truncate and feebly produced (Fig. 40); aedeagal complex (Figs. 38, 39) with aedeagus longer than lateral valves; tenth tergite truncate posteriorly, without surstyli (Fig. 37). Length 5.3 to 6.6 mm.

*Female.* Differs from male as follows: head with frons and face brownish black

to black, shiny, sometimes with bluish or greenish reflections; frons 0.28 to 0.37 width of head at anterior ocellus, finely punctate, with small round depression above antennae, rarely with faint longitudinal striae below ocelli; pile of head pale, very rarely darker below antennae, that of face at most the length of the first antennal segment; antennae black with apex of second segment and inner portion of basal flagellomere yellow, ranging to having yellow coloration on apex of first segment, entire second segment, entire first flagellomere, and inner portions of flagellomeres two to six; hairs of first two antennal segments ranging from entirely pale to entirely black; flagellum 2.0 to 2.5 times length of first two antennal segments combined (Fig. 8). Thorax with mesonotum shiny green, more often with bluish reflections than in male, pleura often more extensively brownish; pile usually pale, shorter than in male; legs with hind coxae sometimes yellow, femora and tibiae yellow, apex of hind femora may be evanescently brownish. Abdomen dark to light brown; tergites with most of segments one and two, and basal portions of three, four, and five pollinose, rest shiny; pile pale, shorter than in male; genitalia yellowish, posterior portions of spermathecal ducts sclerotized but short, about the length of the genital segment itself (Fig. 46); median aperture of genital sternite small, medial hind margin behind aperture truncate; cerci yellowish, first segment thicker than terminal segment. Length 4.7 to 6.6 mm.

**Distribution** (Map 4). This species is endemic to the Nearctic Region, and is found from British Columbia south to California and extreme western Nevada, east to Alberta and Idaho. A record from northwestern Wyoming needs confirmation.

**Locality Records** (95 males, 103 females). CANADA: *Alberta*: Waterton. *British Columbia*: Bevan, Vancouver Island; Crowsnest; Duncan, Goldstream, Vancouver Island; Hope, Silver Lake;

Hot Springs, 5 mi. S of Lakelse; Mission City; Osoyoos, Anarchist Mtn.; Terrace; Tyee, 27 mi. E of Prince Rupert. UNITED STATES: *California*: Del Norte Co.; Los Angeles Co.; Nevada Co.; San Bernardino Co.; San Mateo Co.; Siskiyou Co.; Trinity Co. *Idaho*: Clearwater Co.; Latah Co. *Nevada*: Ormsby Co. (W of Carson City). *Oregon*: Benton Co.; Clackamas Co.; Curry Co.; Douglas Co.; Hood River Co.; Jefferson Co.; Marion Co.; Tillamook Co.; Washington Co. *Washington*: Chelan Co.; Clallam Co.; Clark Co.; King Co.; Lewis Co.; Mason Co.; Okanogan Co.; Pacific Co.; Skamania Co.; Snohomish Co.; Spokane Co.; Whitman Co.; Yakima Co.

One further locality seems doubtful: *Wyoming*: Yellowstone Park, Clematis Creek. Further collecting may substantiate the presence of *B. luteipes* that far east, but in light of what is currently known of its distribution, it seems unlikely. Thus this single male specimen, which I have examined, may be mislabeled.

**Flight Period.** Specimens of this species have been collected as early as 20 May, and as late as 2 August, with the vast majority of records from June and July.

**Biology.** The immature stages of this species remain unknown. Adults have been collected in Malaise traps, both unbaited and baited with CO<sub>2</sub>. I have collected females in low vegetation along a small, open stream at moderate elevation in Washington. Label data indicate collections from "marshy lake and stream margin," "plants in swamp," and "plants along river." The species has also been collected from flowers of *Heracleum lanatum* and "Umbelliferae" (both from British Columbia). The latter record was cited by McFadden (1972) under *Beris annulifera* (= *B. fuscipes*); I have examined the specimen seen by him, and it was misidentified.

**Remarks.** This species has been known as *Beris californica* since it was first discovered to be specifically distinct by



James (1939). Examination of the holotype of *Beris annulifera* var. *luteipes* Johnson, originally described as a variety, but subsequently recognized as a subspecies by James (1965), indicated that it was a distinct species, conspecific with *B. californica* rather than with *B. fuscipes*. This was subsequently confirmed by examination of the holotype of *B. californica*. *Beris luteipes* thus becomes the valid name for the taxon by priority. McFadden (1972) synonymized the variety with *B. annulifera* (= *B. fuscipes*), and indeed Johnson's original series was mostly that species, but the holotype male is clearly conspecific with *B. californica*. The holotype was collected at Seattle, Washington, which is outside the range of *Beris fuscipes*. I can only conclude that McFadden did not examine the holotype to substantiate his synonymy.

*Beris luteipes* is the only species in the genus that is endemic to the Nearctic Region. It must be pointed out, however, that the structure of the genitalia indicates a close relationship with *Beris heptapotomica* Pleske (see Nartshuk and Rozkošný, 1975) which is known from the USSR, and *Beris* sp. A of Nagatomi and Tanaka (1972). I have not examined specimens of either of these taxa. Nartshuk and Rozkošný have noted the similarity of *B. heptapotomica* to *Beris* sp. A.

Females from the area of distributional overlap with *B. fuscipes* can be difficult to determine with certainty. The length of the antennal flagellum is somewhat variable, but it is usually not as wide basally as that of *B. fuscipes*, nor is it generally as short. The range of overlap between *B. luteipes* and *B. fuscipes* is not yet well understood, and if the record of the former from Wyoming that now appears doubtful is substantiated the region may be larger than is presently anticipated. Thus, it is desirable to check the genitalia of females not associated with males to identify them positively. The genitalia are relatively invariable, and are quite diagnostic at the specific level,

but unfortunately are not visible without dissection.

Coloration of the legs, pilosity, and to some extent the mesonotum, is variable in this species. The length of the antennal flagellum is somewhat variable, and is sexually dimorphic (Figs. 7, 8), that of the males being shorter and more compact. In general, the palest specimens, and those with the longest antennal flagella, have been recorded from California.

### *Beris strobli* Dušek and Rozkošný

*Beris chalybeata* var. *obscura* Strobl, 1909: 47 (preoccupied by *obscura* Meigen, 1820: 4).

*Beris strobli* Dušek and Rozkošný, 1968: 294 (new name for *obscura* Strobl).

*Beris latifascies* Nagatomi and Tanaka, 1972: 100.

**Type Material.** The holotype female of *Beris chalybeata* var. *obscura* Strobl is in the Strobl collection, presently housed at the Institutes für Pflanzenschutzforschung in Eberswalde, East Germany, in the care of G. Morge. It is in poor condition, missing the left antenna, the flagellum of the right antenna, the two apical tarsomeres of the left front leg, the apical tarsomeres of the right middle leg, the entire hind legs, the left wing, and the abdomen.

**Diagnosis.** Males can be told easily by the structure of the genitalia: the gonostyli are large and strongly arcuate, and the medial process of the ventral bridge of the gonocoxites is well developed and bilobed (Fig. 44). Females are difficult to determine positively, except by use of the genitalia, which have the spermathecal ducts unsclerotized posteriorly, and the median apertures of the genital sternite very large (Fig. 47). Both sexes have compact, short, conical antennal flagella, which taper gradually toward the apex, and are composed of seven segments (Fig. 9), although this is difficult to detect. The palpi are very small, and also quite difficult to observe; this character can be used to some extent to separate females from *B.*

*fuscipes*, which has larger (although still minute) palpi.

**Description. Male.** Head brownish black to black, frons and face shiny, upper occiput pollinose; entire head including eyes pilose, pile mostly black, but pale hairs may be intermixed below antennae; hairs at oral margin about the length of the first two antennal segments combined, those of frons about the length of the first segment; antennae (Fig. 9) shorter than the length of head, black, first two segments sometimes brownish; scape and pedicel subequal in length; flagellum compact, blunt conical, about 1.7 times as long as the first two segments combined, composed of seven flagellomeres; pile of antennae black; proboscis yellow; palpi very minute, more or less spherical; ocelli yellowish, ocellar tubercle somewhat prominent. Thorax with mesonotum somewhat shiny, metallic greenish; pleura brownish to blackish, dorsal sclerites sometimes with greenish reflections; scutellum concolorous with mesonotum, normally with six spines; pile of thorax yellowish to brownish, about half the length of antennae; legs brownish black with apices of femora and basal one-fourth to one-third of all tibiae yellow; ranging in some specimens to mostly yellow except front and hind coxae, apices of all basitarsi, and entire distal four tarsomeres of all legs brownish; wings brownish, stigma darker, evenly set with microtrichia; halter yellow, sometimes with apex of stem and base of knob brown. Abdomen brownish, tergites subshiny, very finely pollinose; sternites shiny; pile pale, longest laterally; genitalia (Figs. 41–44) brown, gonostyli large, arcuate, yellowish; postero-medial portion of ventral bridge of gonocoxites strongly produced, bilobed (Fig. 44); aedeagal complex (Figs. 42, 43) arcuate, aedeagus much shorter than lateral valves; tenth tergite (Fig. 41) truncate posteriorly, without surstyli. Length 5.3 to 6.2 mm.

**Female.** Differs from male as follows: head brownish to brownish black; pile of

head mostly pale, short, at most the length of the first antennal segment; frons at anterior ocellus 0.29 to 0.37 width of head, slightly to distinctly longitudinally striate below ocelli, slightly depressed just above antennae; antennae brownish to black, with apex of second segment and flagellum with inner portions of flagellomeres one and two (sometimes ranging as far as the sixth), yellowish; hairs of antennae pale to brownish, those at apex of flagellum black. Thorax with mesonotum sometimes more brilliantly metallic than in male; pile shorter, pale; legs rarely as dark as in most males, often wholly pale yellow with apical tarsomeres brownish. Abdomen brownish, shiny, terminal segments sometimes slightly paler; cerci with first segment thick, second much thinner, deflated when dry, thus appearing laterally compressed; genitalia (Fig. 47) with spermathecal ducts unsclerotized posteriorly (thus not shown in Fig. 47); median aperture of genital sternite very large; medial hind margin of genital sternite posterior to aperture feebly bilobed. Length 4.9 to 5.9 mm.

**Distribution** (Map 4 shows Nearctic portion). Holarctic; from western Europe east to Japan in the Palaearctic Region (Nartshuk and Rozkošský, 1976: 132, map); from Alaska east to Ontario, Wisconsin, and Minnesota in the Nearctic Region.

**Locality Records** (24 males, 29 females). UNITED STATES: ALASKA: 15 mi. SE of Anchorage; Big Delta, Lake Boleo; Richardson Highway mile 315; Salcha River, Alaska Highway mile 1481; Shaw Creek, Richardson Highway mile 289; Unalakleet. CANADA: *Alberta*: Bilby; Edmonton; Gull Lake; Jumping Pond Creek, 20 mi. W of Calgary; McMurray; Wabamun. *British Columbia*: Atlin, 3000 ft.; Ft. Nelson; Liard Hot Springs, Alaska Highway mile 496, 1500 ft. *Manitoba*: 5 mi. SW of Shilo. *Northwest Territories*: Ft. McPherson; Norman Wells. *Ontario*: Macdiarmid, Lake Nipigon; One Sided Lake. *Yukon*: Dawson; LaForce, 132°20', 62°41', 3300 ft.; North Fork Crossing,

Peel Plt. Road mile 43, 3500 ft.; Rampart House; Swim Lakes, 133°, 62°13', 3200 ft. UNITED STATES: *Minnesota*: Cool Co., Grand Marais. *Wisconsin*: Door Co.

*Flight Period.* Collection dates range from 28 May to 28 July. All specimens except the one May record were taken in June and July.

*Biology.* The immature stages of this species have not been collected. Adults have been collected from vegetation, notably "swept ex *Equisetum* sp." (Manitoba) and from *Salix* (Yukon). The former record was previously attributed to *Beris fuscipes* (as *B. annulifera*) by McFadden (1972), but reexamination of that specimen has shown it to be this species.

*Remarks.* This species has not previously been reported from the Nearctic Region. This is surprising, since some male specimens have been previously determined as *Beris annulifera* (= *Beris fuscipes*), yet they completely lack the surstyli of the tenth tergite which are easily visible externally on male specimens of *B. fuscipes*. Specimens of *B. strobli* are not common in North American collections, probably because the species is primarily an inhabitant of far northern areas that are seldom collected.

I have examined the type of *B. chalybeata* var. *obscura* Strobl. While it is so badly damaged now that it is difficult to be sure of its identity, I am following the synonymy established in the literature by Dušek and Rozkošný (1968). Through the kindness of Rudolf Rozkošný, I was able to examine other European specimens of *B. strobli*, and was able to confirm the conspecificity of Nearctic material. Nartshuk and Rozkošný (1976) proposed the synonymy of *B. latifascies* Nagatomi and Tanaka, described from Japan. I have not yet examined the holotype of that taxon.

This species is likely to be confused only with *Beris fuscipes*, with which it is widely sympatric in northern regions. Males are easily determined by their genitalia, which are visible externally. But females are difficult to identify with

certainly unless specimens of both species can be compared. With single female specimens it is necessary to examine the internal genitalia. But external characters sometimes of use include the frons, which tends to be wider in *B. strobli* than in specimens of *B. fuscipes*, and definite longitudinal striations are usually present on the frons below the ocelli. These two characters do overlap to some degree in the two species, however. The antennal flagellum is distinctive for each species, but this is difficult to appreciate without having seen both. The flagellum is only seven-segmented in *B. strobli*, which has not been noted in the past. This is difficult to ascertain without clearing the flagellum. Specimens of both *Beris fuscipes* and *B. strobli* have been collected at the same locality on the same date, so overlap of ranges definitely occurs at the local level. Thus for positive identification of females, it is best to examine the genitalia.

*Beris strobli* probably does not occur in sympatry with *Beris luteipes*, except possibly in southeastern British Columbia or southwestern Alberta. They have not as yet been recorded from the same locality.

### Genus EXODONTA Rondani

*Exodontha* Rondani, 1856: 169; type species *Exodontha pedemontana* Rondani (= *Beris dubia* Zetterstedt), by original designation.

*Hexodonta*, emend.

*Acanthomyia* Schiner, 1860: 49; type species *Beris dubia* Zetterstedt, by original designation.

*Scoliopelta* Williston, 1885: 152; type species *Scoliopelta luteipes* Williston, by monotypy.

*Diagnosis.* Members of the genus *Exodontha* may be recognized by their rather large, robust form and the lack of preapical transverse grooves on the abdominal tergites. Other characters include eyes densely pilose, holoptic in males, widely separated in females; antennae with basal two segments subequal, flagellum with eight flagellomeres; palpi two-segmented; thorax quite convex, scutellum with three to four pairs



of spines; middle tibia with one small apical spur; wing with  $R_4$  and r-m present,  $M_1$  and  $M_2$  petiolate to separate at discal cell,  $M_3$  present, but abbreviated, not reaching wing margin; stigmal area elongate, narrow; abdomen broad, the first five segments large, with six and seven telescoping into the abdomen.

*Exodontha* is not likely to be confused with any other North American genus of Beridinae because of its large, robust size. *Allognosta* is the only other genus with a spur on the middle tibia, but it is much smaller, possesses preapical transverse grooves on the abdominal tergites, and has no spines on the scutellum. The genus *Exodontha*, as recognized here, is a genus with two species, both of which are found in the Nearctic Region. One of these is also found in northern areas of the Palaearctic Region. James (1973) synonymized *Exodontha* with *Antissa* Walker, a genus based on the type species *Clitellaria cuprea* Walker from Australia. I have examined a number of the Australian and Neotropical forms assigned to the "Antissini," and while they may well be closely related to *Exodontha*, I cannot concur with the above synonymy. The form of the antennae and male genitalia is quite different in these Southern Hemisphere forms; thus at present it is best to consider *Exodontha* generically distinct. It is apparent from the generic diagnosis that this genus is rather divergent from the other Beridinae. The lack of transverse preapical tergal grooves on the abdomen, and the reduced sixth and seventh abdominal segments are exceptional in this regard. A revision of the genera of Beridinae is needed to clarify the relationships of these genera, and such studies may well indicate that the genera related to and including *Antissa* and *Exodontha* should be removed from the subfamily. Hardy (1932) and James (1973) consider the group to be a component of the diverse subfamily Clitellariinae, and it has occasionally been accorded subfamilial rank (White, 1916;

Daniels, 1978). I prefer to assign *Exodontha* to the Beridinae at present simply because it has traditionally been placed in that subfamily in recent revisions and catalogs (James, 1965; McFadden, 1967; Rozkošný, 1973) that deal with the Nearctic and Palaearctic faunas, and because its affinities have not otherwise been adequately documented.

#### KEY TO THE SPECIES OF *EXODONTHA*

1. Legs usually with femora and tibiae dark medially; gonostyli of males with dorso-medial process well developed, widely diverging from the main lobe (Figs. 51, 52); aedeagus subequal in length to the aedeagal valves (Fig. 49); ventral patch of spinules on aedeagal complex large (Fig. 50); western and northern in distribution ..... *dubia* (Zetterstedt)
- Legs usually wholly yellow; gonostyli of males with dorsomedial process poorly developed, hardly diverging from the main lobe (Figs. 57, 58); aedeagus shorter than the aedeagal valves (Fig. 54); ventral patch of spinules on the aedeagal complex small (Fig. 55); eastern, Appalachian distribution ..... *luteipes* (Williston)

#### *Exodontha dubia* (Zetterstedt)

*Beris dubia* Zetterstedt, 1838: 512.

*Exodontha pedemontana* Rondani, 1856: 169.

*Scoliopelta grandis* James, 1938: 156. NEW SYNONYMY.

**Type Material.** A male specimen in the Zetterstedt collection at the Entomological Museum, Zoological Institute, Lund, Sweden, is labeled as the lectotype of *Beris dubia* (by Rozkošný). The specimen is missing both third antennal segments, the left front leg beyond the trochanter, the last tarsomere of the right front leg, and has a little mold on it.

I have not examined the type of *Exodontha pedemontana* Rondani, and do not know where it is presently housed.

The holotype female of *Scoliopelta grandis* James is presently housed in the James Entomological Collection at Washington State University, Pullman, Washington. It was originally said to be in the

collection of Oregon State University (James, 1938). The holotype is missing the right antennal flagellum, the left front tarsus, the last tarsomere of the right front leg, both middle legs (which are glued to the locality label), and the right wing.

*Diagnosis.* This species is characterized primarily by the male genitalia, as outlined in the key. The shape of the gonostylus with its large dorsomedial process is particularly useful because it may be viewed without dissection. Females are very difficult to identify on a morphological basis; at present they may be identified most reliably by where they were collected, i.e., from the western and northern parts of the North American continent. The leg coloration is frequently but not always dark, while the legs of *E. luteipes* are nearly always wholly yellow.

*Description. Male.* Head black, frons and face strongly pollinose; face slightly concave toward middle, with irregular, oblique, longitudinal striations; entire head pilose, hairs of ocellar tubercle blackish, pile of eyes brownish, rest of head with pale yellowish hairs, sometimes a few darker hairs present on face; length of pile fairly uniform, about 1.5 times as long as the first antennal segment, that on lower face longer, and longest on genae where it is almost as long as the antennal flagellum; antennae 0.6 to 0.7 length of head; flagellum elongate conical, about twice as long as both basal segments combined; antennae dark brown to black, apical margin of second segment may be yellowish, inner portion of flagellum occasionally very faintly lighter; longer hairs on antennae a mixture of pale and dark; palpi black, basal segment may be brownish; proboscis brownish yellow. Thorax blackish, often with metallic greenish reflections, densely but finely punctate; humeri, postalar calli, lateral part of mesonotal suture, and sometimes extremities of scutellum brownish yellow to yellowish; pleura concolorous with mesonotum but usually

without metallic reflections, sometimes brownish around sutures, the sclerites below the wing base usually brownish; almost entire thorax clothed with pale whitish yellow hairs, sometimes darkish on mesal portion of mesonotum and scutellum, averaging a little longer in length than both basal antennal segments combined; posterior part of pteropleuron and almost entire hypopleuron bare; legs dark brown except for yellowish coloration on apices of all femora, bases and extreme apices of all tibiae, and basal two-thirds of basitarsi and basal halves of tarsomeres two and three of all legs; wings light grayish brown, evenly set with microtrichia, stigma darker but not strongly contrasting with rest of wing; halter yellow, stem sometimes brownish. Abdomen dark brown to blackish, finely punctate; basal rows of pits on tergites two to five rather confused, individually indistinct; fifth tergite with fine, transverse sculpturing; pilosity mostly dark, short medially, longest laterally, sternites with appressed, short, pale yellowish pile; hypopygium yellowish brown, tenth tergite rounded posteriorly (Fig. 48); genitalia (Figs. 49–52) with ventral bridge of gonocoxites without medial process; gonostyli large, with dorsomedial process large, diverging strongly from main lobe (Figs. 51, 52); aedeagus subequal in length to the aedeagal valves, which are attenuated posteriorly (Fig. 49); spinules of aedeagal complex forming a large patch (Fig. 50). Length 7.4 to 8.8 mm.

*Female.* Differs from male as follows: head may be brownish; lower frons and face pollinose, sharply delimited from the finely punctate upper frons by a transverse line; width of frons at anterior ocellus 0.40 to 0.47 width of head; upper frons with a very shallow medial longitudinal depression; frontal and occipital eye margins very narrowly pollinose; pilosity of head shorter than in male, not longer than the length of the first antennal segment, pale, except darkish on eyes. Thorax with pile

shorter than that of male, wholly pale, semiappressed on mesonotum; legs may be lighter in color than in male, in the palest specimens they may be wholly yellow. Both thorax and abdomen with more extensive brown areas than found in males, occasionally almost wholly brown. Female terminalia with no distinctive specific features, essentially the same as figured for *E. luteipes* (Fig. 56). Length 7.8 to 11.3 mm.

**Distribution** (Map 2 shows Nearctic portion). Holarctic; ranging from Scandinavia and mountainous regions in central Europe east to Japan in the Palaearctic Region (Nartshuk and Rozkošný, 1975: 88, map) and from the Pacific Northwest east to Quebec in the Nearctic Region.

**Locality Records** (10 males, 10 females). CANADA: *British Columbia*: Hope Mts. (1♀); Robson (2♂, 2♀); St. Marys (1♀); Skeets Falls (1♂). *Quebec*: Mistassini Post (1♂). UNITED STATES: *Idaho*: Kootenai Co., 10 mi. N of Harrison on Lake Coeur d'Alene, 2100 ft. (1♀); Shoshone Co., Wallace (3♂, 2♀); Valley Co., 1–10 mi. S of Smith's Ferry (1♂). *Oregon*: Baker Co., Lower Goose Creek, 36 mi. SE of Union, 4000 ft. (1♂); Clatsop Co., Cannon Beach (1♀). *Washington*: Asotin Co., Fields Spring State Park (1♀); Grays Harbor Co., 2 mi. S of Queets (1♂); Whitman Co., Kamiak Butte (1♀).

**Flight Period.** Dates of collection range from 3 June to 12 August.

**Biology.** McFadden (1967) found and reared larvae of what is almost certainly this species (from Banff National Park, Alberta), which were identified as *E. luteipes*, since the identity of western specimens was not known at that time. They were found in "moist rotting wood under large boulders on a mountainside at an elevation of approximately 6000 ft." Adults occur in forested areas, but little is known of their habits. Specimens have been collected by sweeping and in Malaise traps baited with CO<sub>2</sub>.

**Remarks.** The identities of the Nearctic members of this genus have been con-

fused until now, in part due to their rarity. All specimens have been known under the name *Exodontha luteipes* (Williston), except for two female specimens that were identified as *E. grandis* (James) (the holotype and one additional specimen). It has been discovered during the course of this work that specimens from the northwestern United States and Canada were conspecific with *Exodontha dubia* (Zetterstedt), a well known but rare species previously known only from the Palaearctic Region. I have examined the Zetterstedt type which confirmed this identity.

The holotype female of *Scoliopelta grandis* James was also examined, and I have concluded that it is a junior synonym of *E. dubia*. It is unfortunate that the specimen is a female, as females are very difficult to identify reliably in this genus. The female genitalia have not proved diagnostic as they have in other Beridinae. The brownish color, the length of M<sub>3</sub>, and the separation of M<sub>1</sub> and M<sub>2</sub> at the discal cell, all of which were characters used to characterize *E. grandis*, are variable within this species. Consequently, I feel that this taxon is best relegated to synonymy under *E. dubia* until evidence is discovered to the contrary. It should be pointed out that McFadden (1972) also suspected this synonymy.

As mentioned above, the coloration of this species is variable. It is possible that this is simply a reflection of the maturity of specimens at capture. The female genitalia are not specifically distinct; they are illustrated for *E. luteipes* only, for the sake of comparison with other genera treated in this paper. At present, females are best identified by where they were collected, but due to the rarity of both species in the genus, their distributions are incompletely known. To give some indication of the reliability of the locality records cited in this paper, I have included the sexes of the specimens examined from each locality in that section.



***Exodontha luteipes* (Williston)***Scoliopelta luteipes* Williston, 1885: 154.

**Type Material.** The lectotype of *Scoliopelta luteipes* Williston is presently housed in the Snow Entomological Museum at the University of Kansas, Lawrence, Kansas. The male specimen is in perfect condition. The lectotype was designated by McFadden (1972; the second original label reads "Aug.," not "A. Fig." as indicated by McFadden).

**Diagnosis.** Male genitalia characters outlined in the key are the only reliable characters useful for determining members of this species. The small dorsomedial process of the gonostylus may be viewed without dissection. Female specimens may be identified most reliably by their collection sites; the species has an Appalachian distribution. A character of limited usefulness is the leg coloration. The legs are wholly pale in all specimens examined except one, whereas they are frequently darker in *E. dubia*, often having the femora and tibiae with extensive dark brown coloration.

**Description.** *Male.* Similar to *E. dubia*, but differing as follows: head with eye pilosity sparser, subequal in length to the first antennal segment; antennae with basal two segments brownish, yellowish at apex of second, inner portions of flagellomeres three to five with distinct light brownish area. Thorax with mesonotum with metallic reflections rather more bronzy; lateral areas paler, brownish yellow, irregularly more extensive than in *E. dubia*, extending along lateral margins and often onto scutellum; pleura brownish, with the areas which are brownish in *E. dubia* quite yellowish, including sclerites below wing base; pile of thorax more golden yellow; legs wholly orangish yellow, femora may be faintly darker. Abdomen brownish, sometimes with an almost purplish cast; basal rows of pits on tergites two to five with individual pits distinct; pilosity pale, golden colored; genitalia (Figs. 53–55, 57–58) with

gonostyli only slightly bilobed, the dorsomedial process reduced (Figs. 57, 58); aedeagus shorter than aedeagal valves, which are truncate apically (Fig. 54); spinules on ventral surface of aedeagal complex less extensive (Fig. 55); tenth tergite truncate posteriorly (Fig. 53). Length 7.1 to 8.1 mm.

**Female.** Extremely similar to *E. dubia*; frons 0.37 to 0.47 width of head; coloration more brownish than in males, especially the thorax; legs as in male, except in one specimen they are similar in coloration to those of *E. dubia* (see below). Genitalia (Fig. 56) very similar to those of *E. dubia*. Length 7.0 to 9.3 mm.

**Distribution** (Map 2). Known from the Appalachian region of eastern North America, from Vermont and New Hampshire south to North Carolina.

**Locality Records.** (14 males, 8 females). UNITED STATES: *Massachusetts*: Hampden Co., Chester (7♂, 1♀). *New Hampshire*: White Mts. (2♂, 1♀); Grafton Co., Franconia (1♂). *New York*: Essex Co., Upper Ausable (1♂); Orange Co., Bear Mtn. (1♀); Schuyler Co., Texas Hollow (1♀). *North Carolina*: Macon Co., Highlands (Horse Cove) (1♂); Transylvania Co., Pisgah Forest, Looking Glass Park (1♂, 5♀). *Vermont*: Camel's Hump (1♀); Rutland Co., Rutland (2♀); Windsor Co., Woodstock (1♂).

**Flight Period.** Specimens have been collected from 19 July to 30 August.

**Biology.** Nothing is known about this species, either for the immature stages or adults.

**Remarks.** The name *Exodontha luteipes* has long been used for nearly all North American specimens of this genus. Examination of the lectotype of this species has confirmed the application of this name to this taxon, which was found to be distinct from specimens from Canada and the western United States, which are properly assigned to *E. dubia* for the first time in this paper. *Exodontha luteipes* is apparently restricted to the Appalachian region, and is not known to be

sympatric with *E. dubia*. One specimen, a female from Chester, Massachusetts, in the collection of the Museum of Comparative Zoology, has leg coloration that is similar to that found in *E. dubia*, however, and it may be that species. It would appear that if the two species were to have overlapping distributions, it would most likely be in the northern part of the range of *E. luteipes*. Thus a Massachusetts locality for *E. dubia* seems at least possible. Specimens of both species are quite scarce, and a full understanding of their distributions and identities must await the collection of more material, especially males.

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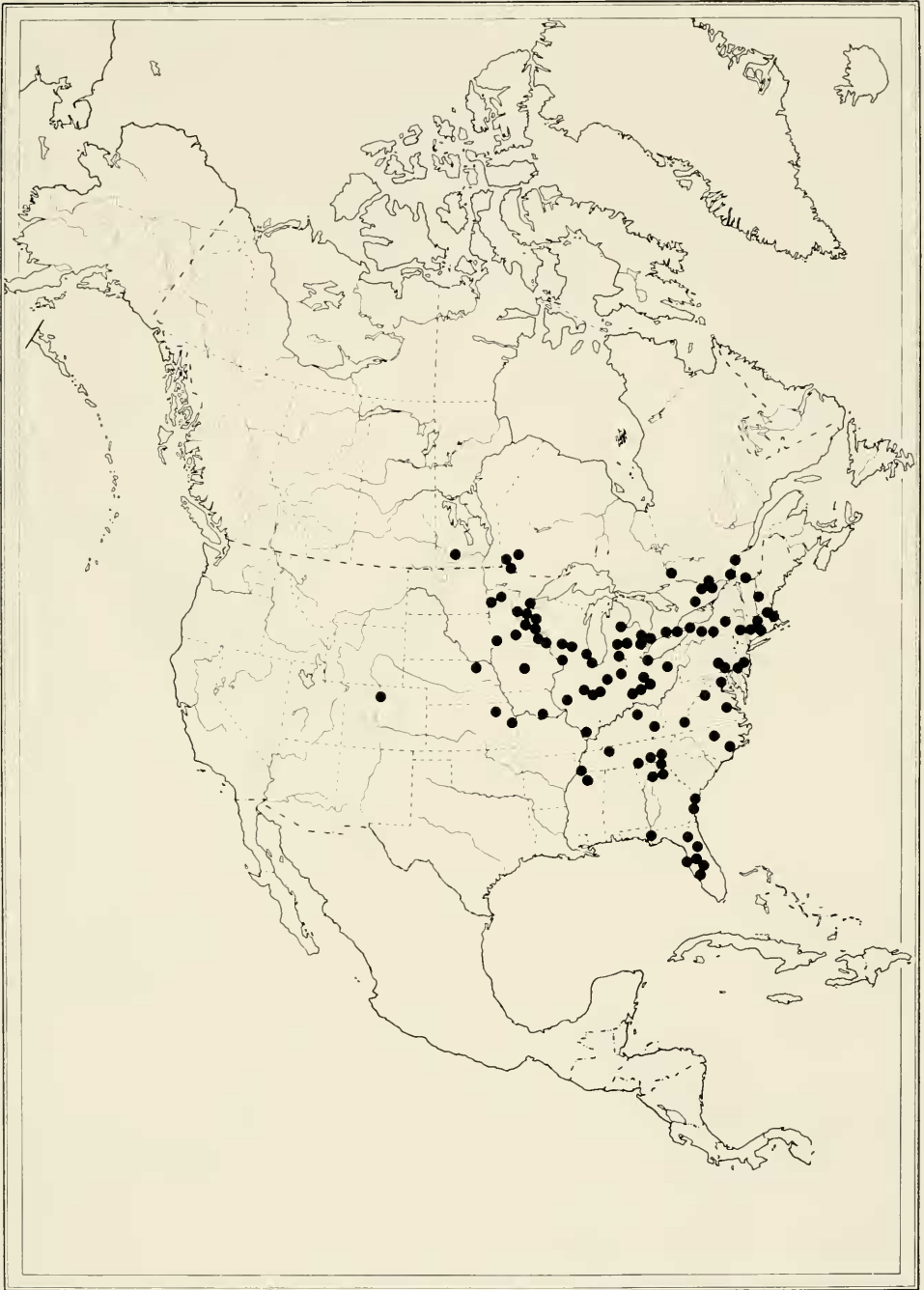




Map 1. Distribution of *Actina viridis* (Say).

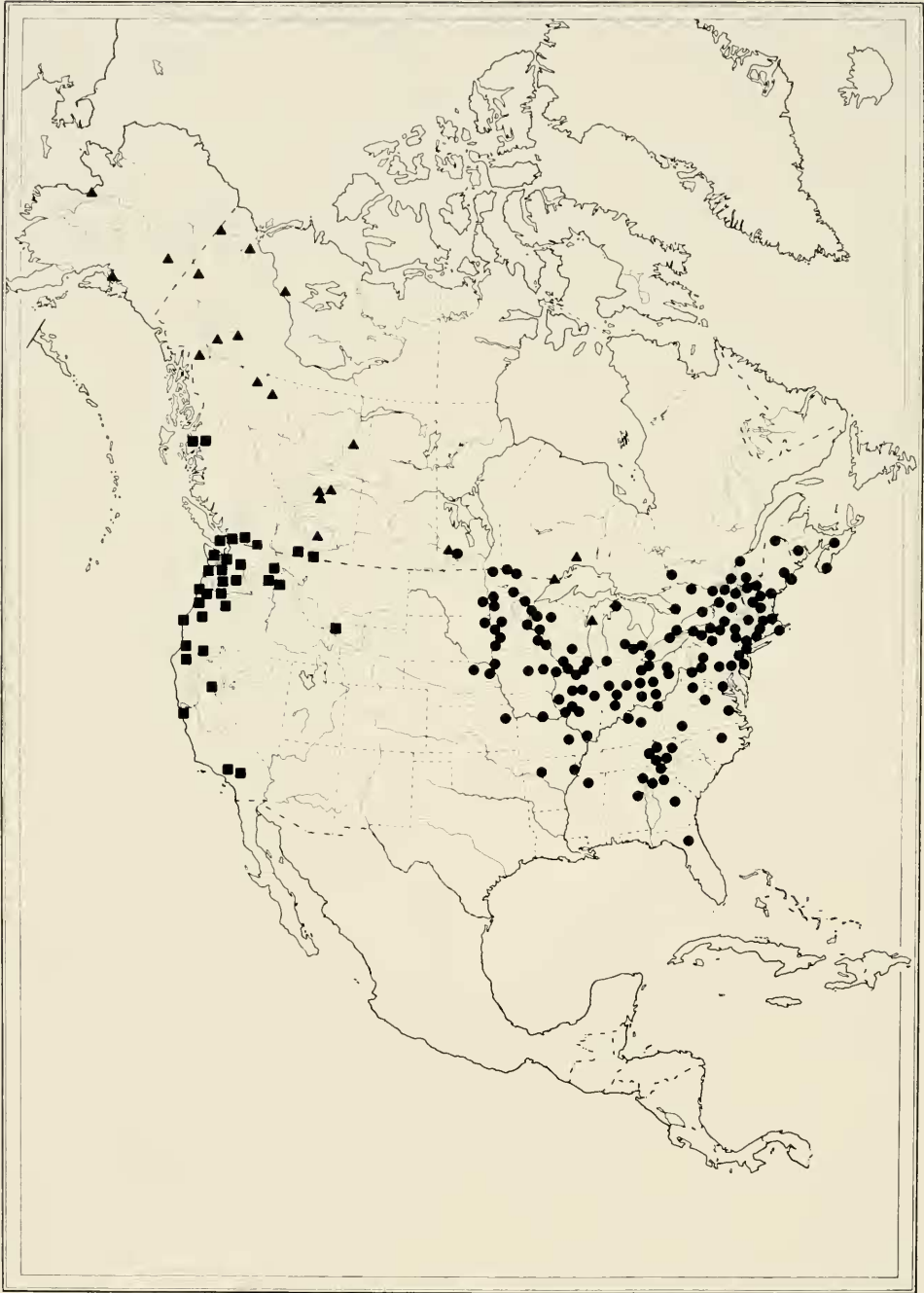


Map 2. Distributions of Beridinae: ●, *Allognosta brevicornis* Johnson; ▲, *Exodontha luteipes* (Williston); ■, Nearctic distribution of *Exodontha dubia* (Zetterstedt).



Map 3. Distribution of *Allognosta obscuriventris* (Loew).

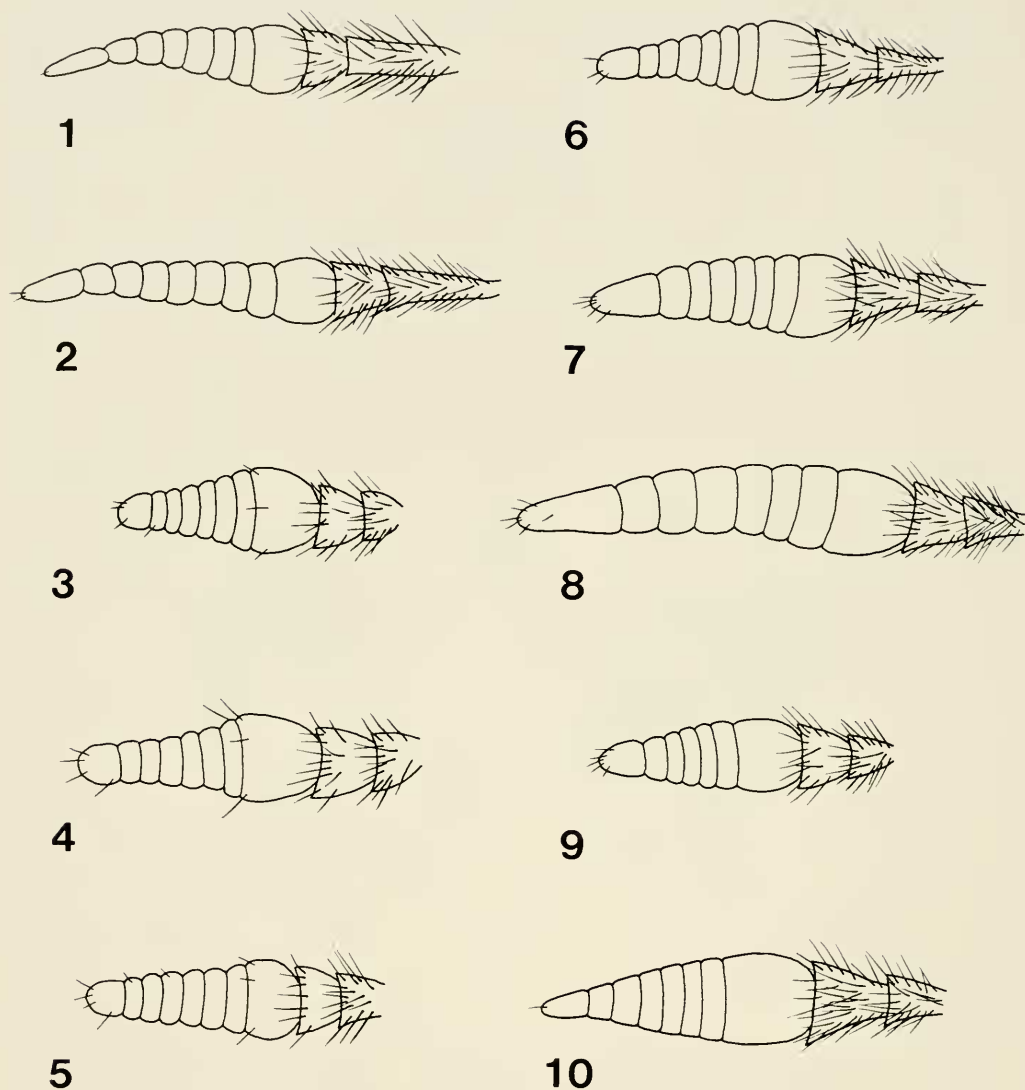




Map 4. Distributions of Beridinae: ●, *Allognosta fuscitarsis* (Say); ▲, Nearctic distribution of *Beris strobli* Dušek and Rozkošný; ■, *Beris luteipes* Johnson.

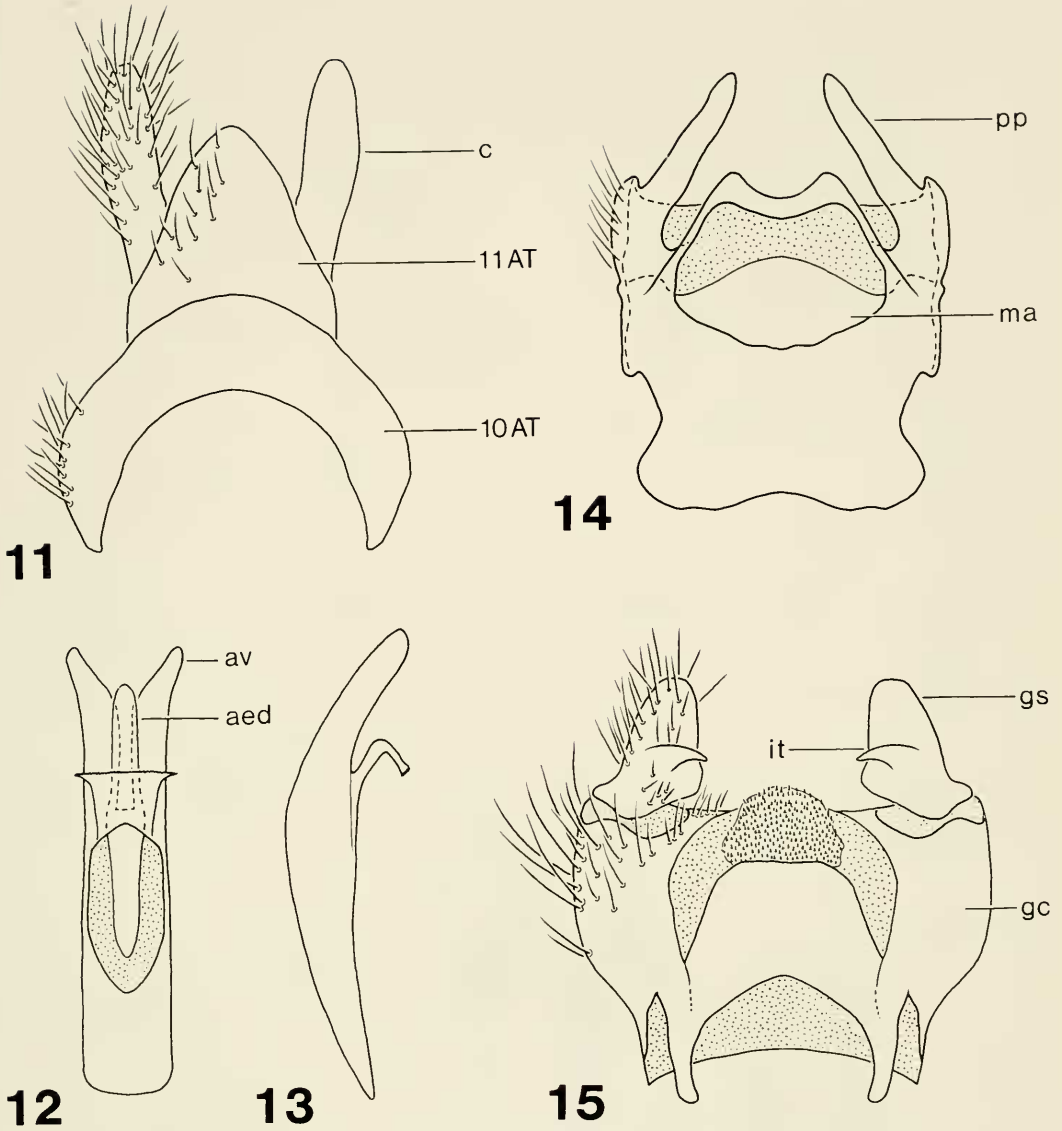


Map 5. Nearctic distribution of *Beris fuscipes* Meigen.



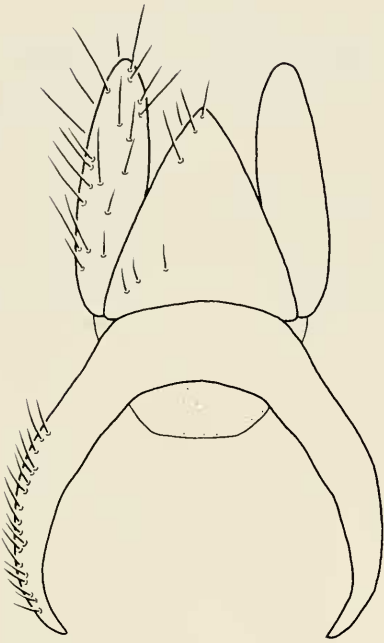
Figures 1–10. Antennae of Beridinae. 1. *Actina viridis* (Say), male. 2. *Actina viridis* (Say), female. 3. *Allognosta brevicornis* Johnson. 4. *Allognosta fuscitarsis* (Say). 5. *Allognosta obscuriventris* (Loew). 6. *Beris fuscipes* Meigen. 7. *Beris luteipes* Johnson, male. 8. *Beris luteipes* Johnson, female. 9. *Beris strobli* Dušek and Rozkošný. 10. *Exodontha dubia* (Zetterstedt).



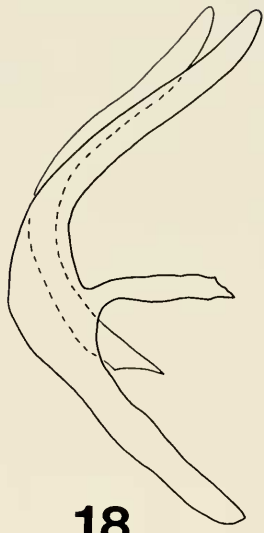


Figures 11–15. Male and female genitalia of *Actina viridis* (Say). 11. male post-genital segments, dorsal view. 12. male aedeagal complex, dorsal view. 13. male aedeagal complex, lateral view. 14. female genital furca, ventral view. 15. male genital capsule, dorsal view.

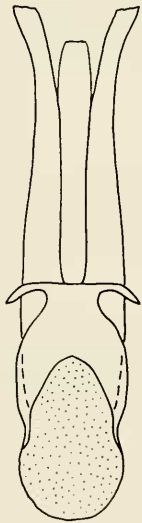
**Abbreviations:** aed, aedeagus; AT, abdominal tergite; av, aedeagal valve; c, cercus; gc, gonocoxites; gs, gonostylus; it, internal tooth; ma, median aperture of genital furca; pp, posterolateral process.



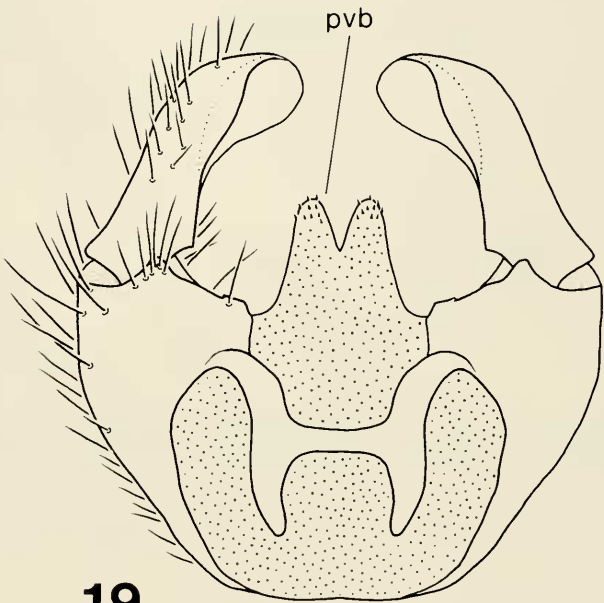
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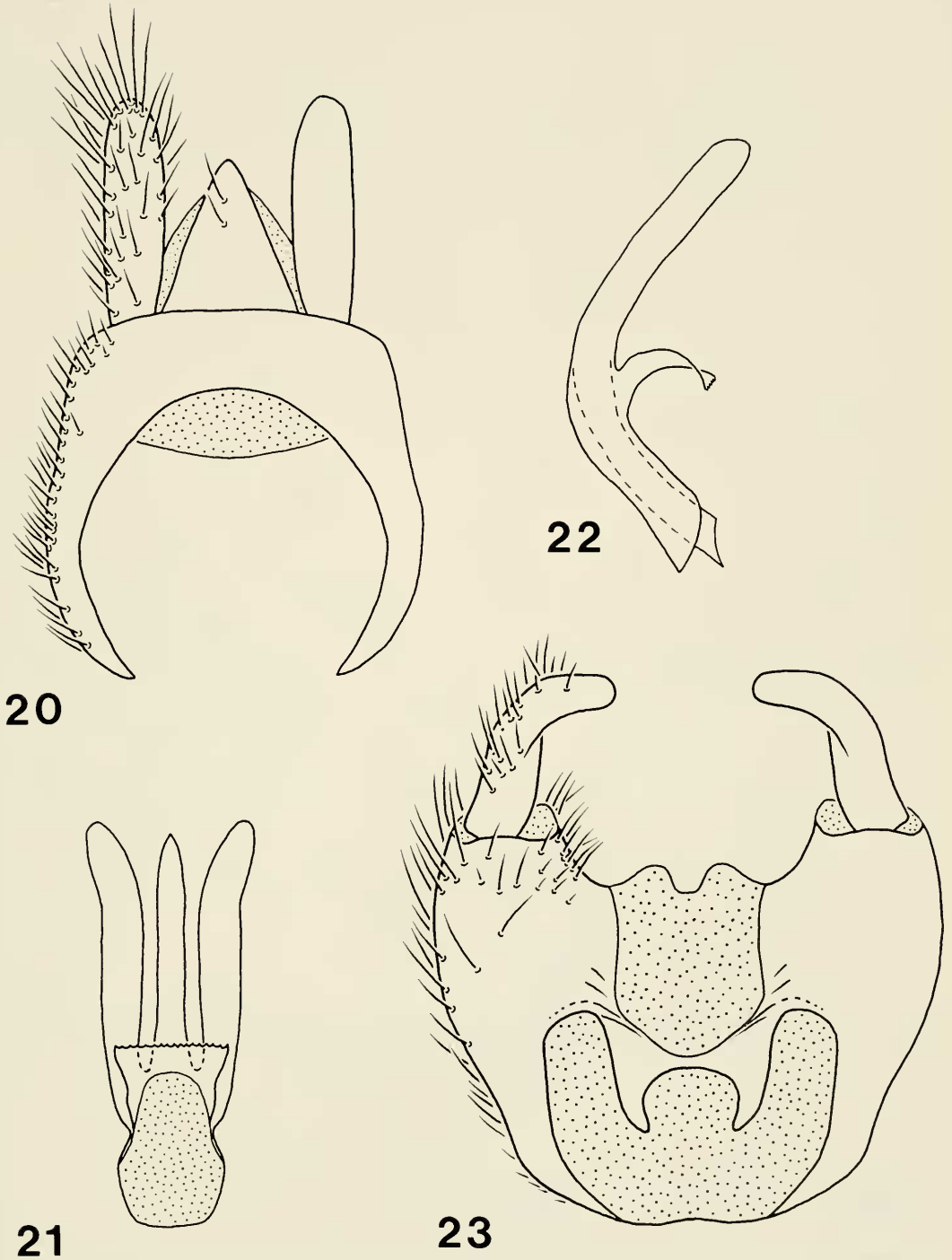


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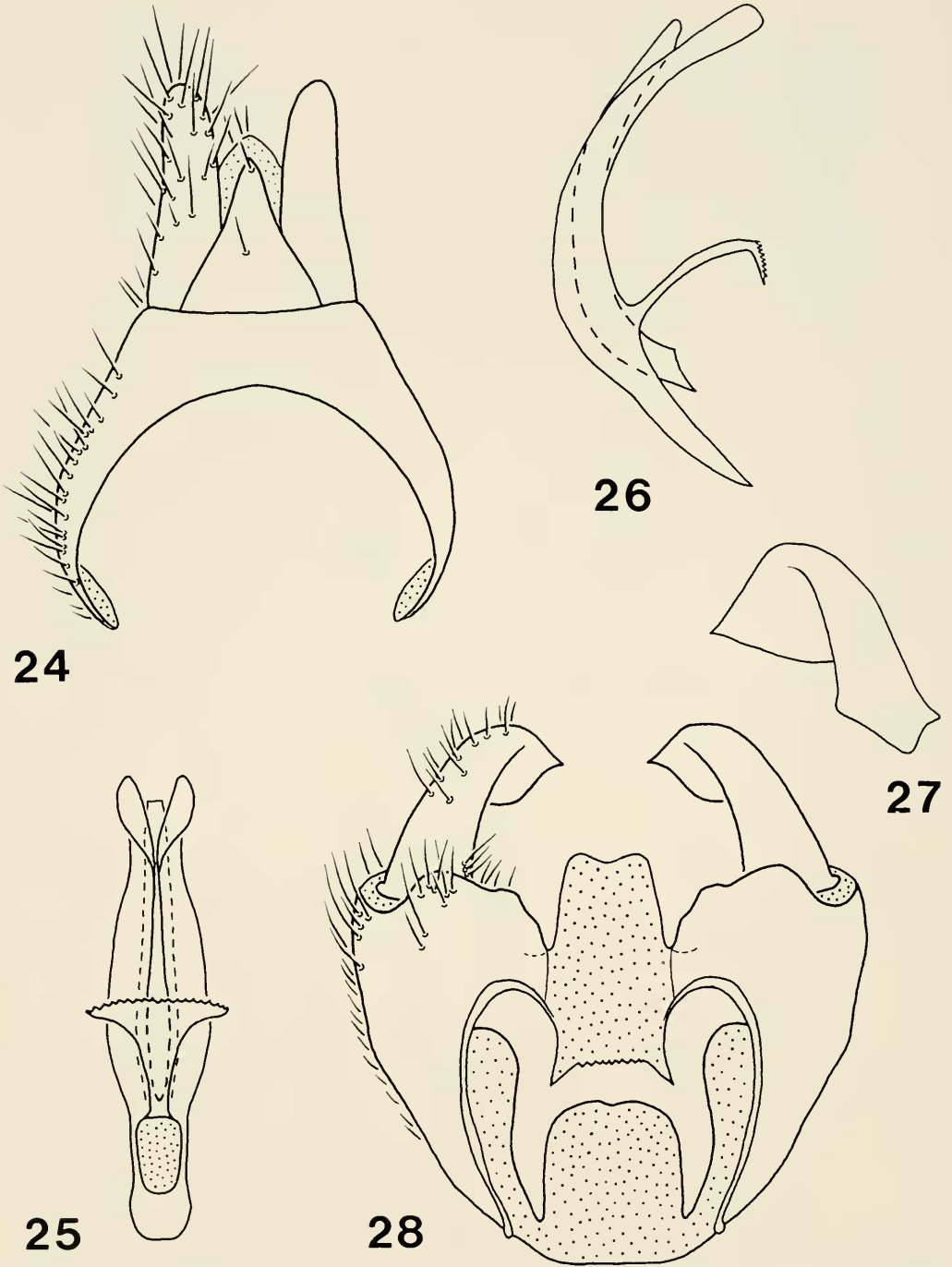
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Figures 16–19. Male genitalia of *Allognosta brevicornis* Johnson. 16. post-genital segments, dorsal view. 17. aedeagal complex, dorsal view. 18. aedeagal complex, lateral view. 19. genital capsule, dorsal view.  
Abbreviation: pvb, process of ventral bridge of gonocoxites.

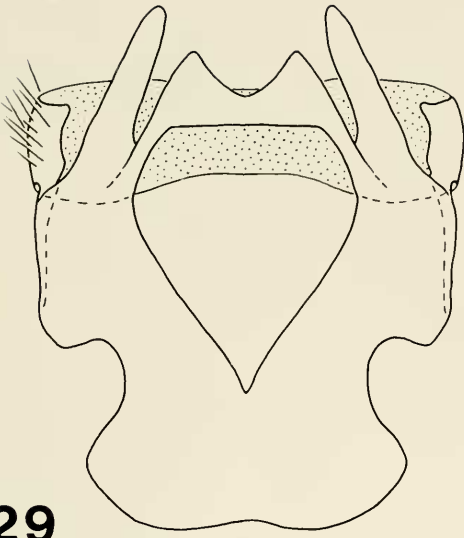
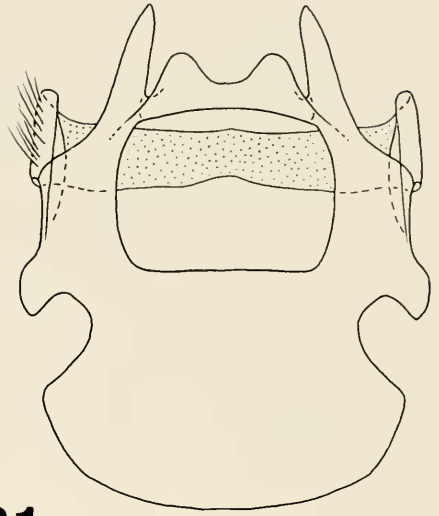
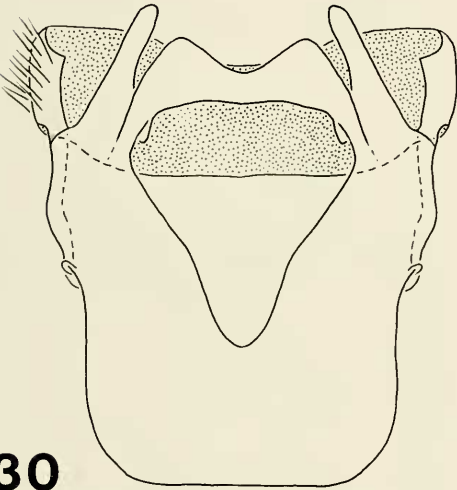
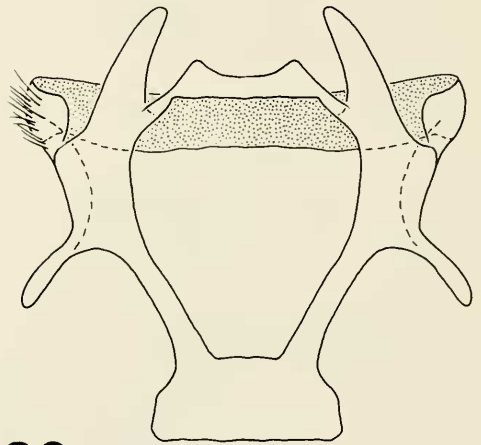


Figures 20–23. Male genitalia of *Allognosta fuscitarsis* (Say). 20. post-genital segments, dorsal view. 21. aedeagal complex, dorsal view. 22. aedeagal complex, lateral view. 23. genital capsule, dorsal view.

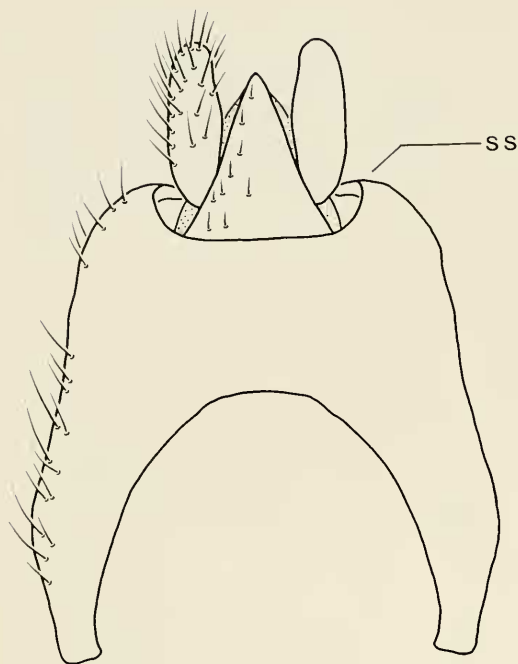




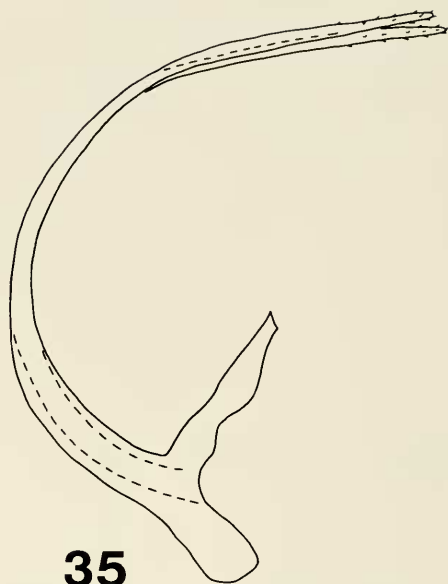
Figures 24–28. Male genitalia of *Allognosta obscuriventris* (Loew). 24. post-genital segments, dorsal view. 25. aedeagal complex, dorsal view. 26. aedeagal complex, lateral view. 27. gonostylus, variant, same view as for genital capsule. 28. genital capsule, dorsal view.

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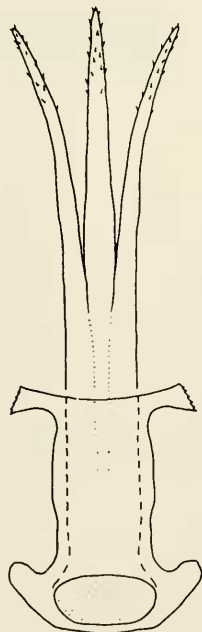
Figures 29–32. Female genital furcae of *Allognosta* spp., ventral views. 29. *A. obscuriventris* (Loew). 30. *A. obscuriventris* (Loew), variant. 31. *A. fuscitarsis* (Say). 32. *A. brevicornis* Johnson.



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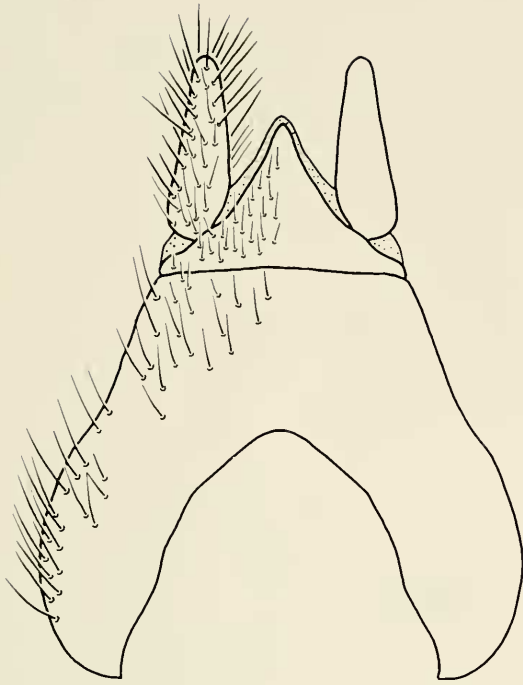
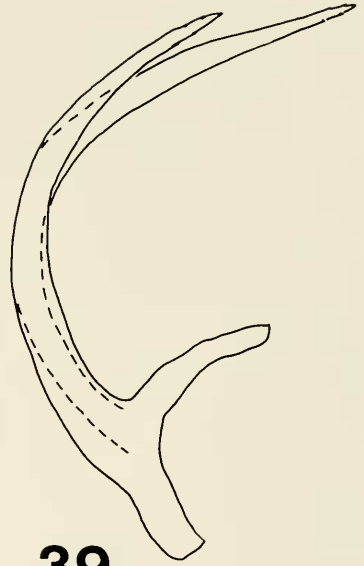
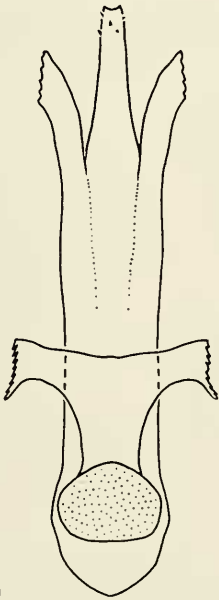
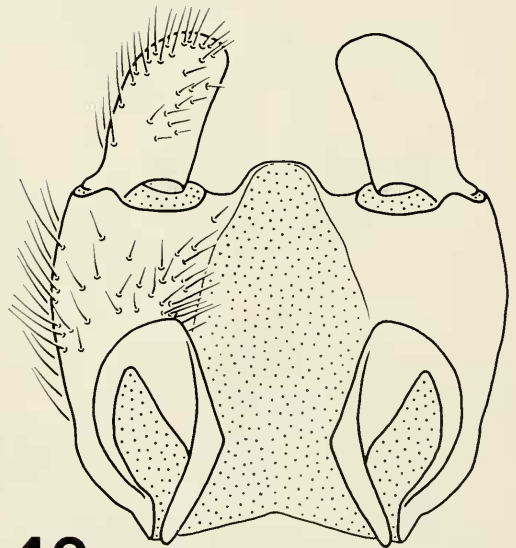


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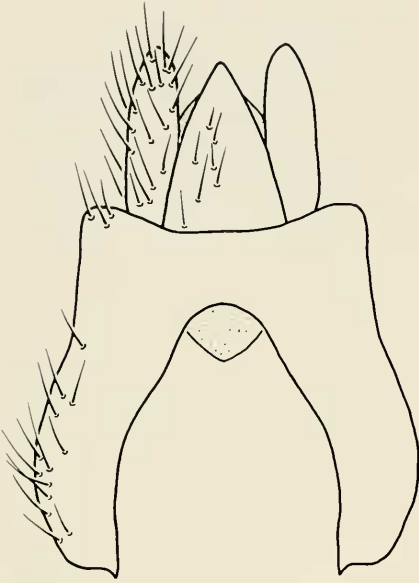
Figures 33–36. Male genitalia of *Beris fuscipes* Meigen. 33. post-genital segments, dorsal view. 34. aedeagal complex, dorsal view. 35. aedeagal complex, lateral view. 36. genital capsule, dorsal view.

Abbreviation: ss, surstylus.

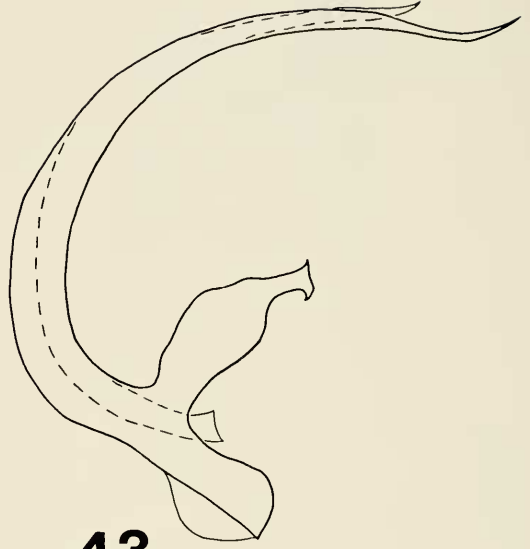


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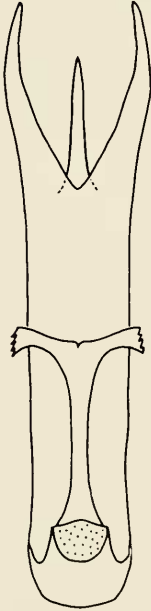
Figures 37–40. Male genitalia of *Beris luteipes* Johnson. 37. post-genital segments, dorsal view. 38. aedeagal complex, dorsal view. 39. aedeagal complex, lateral view. 40. genital capsule, dorsal view.



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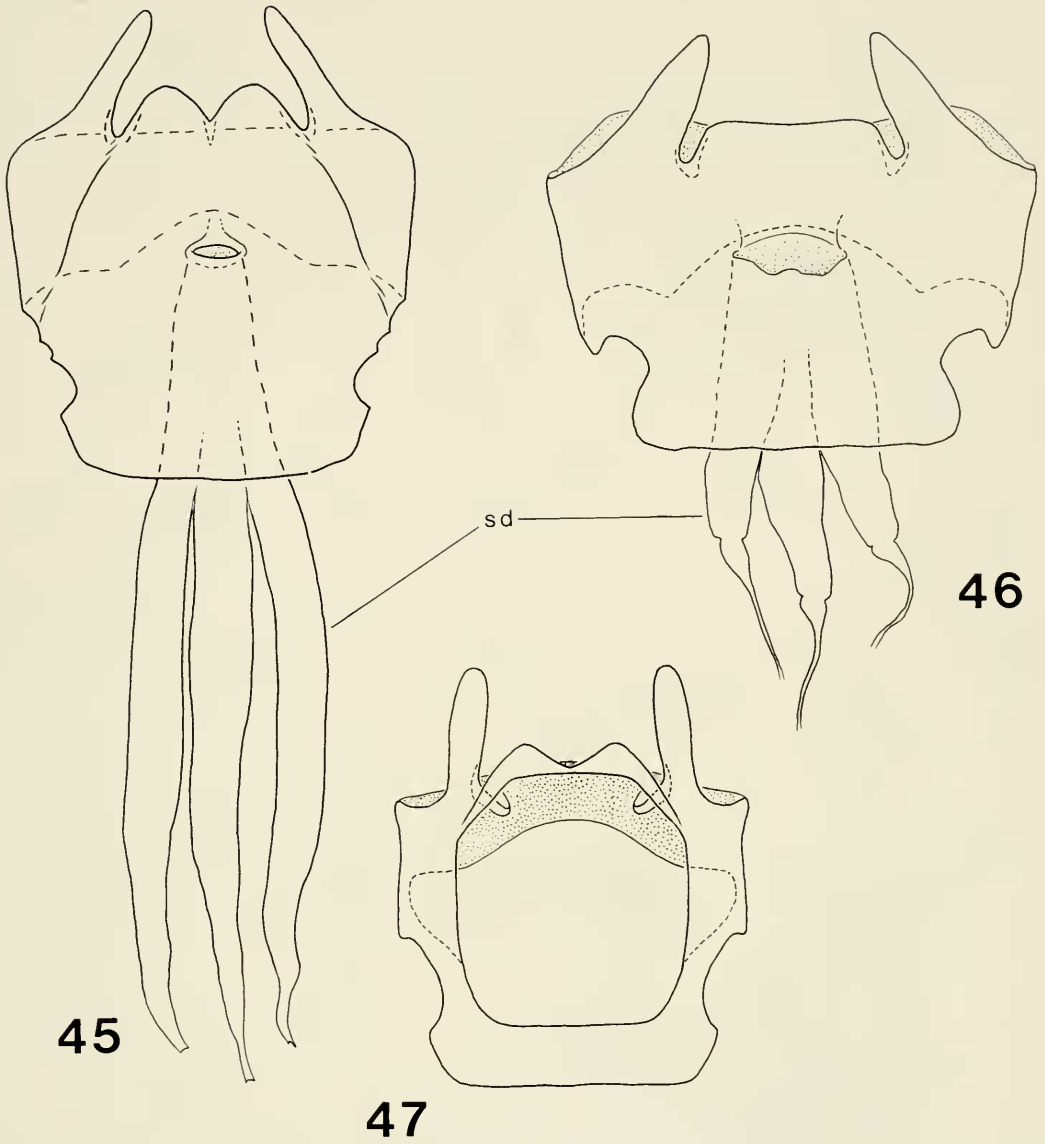


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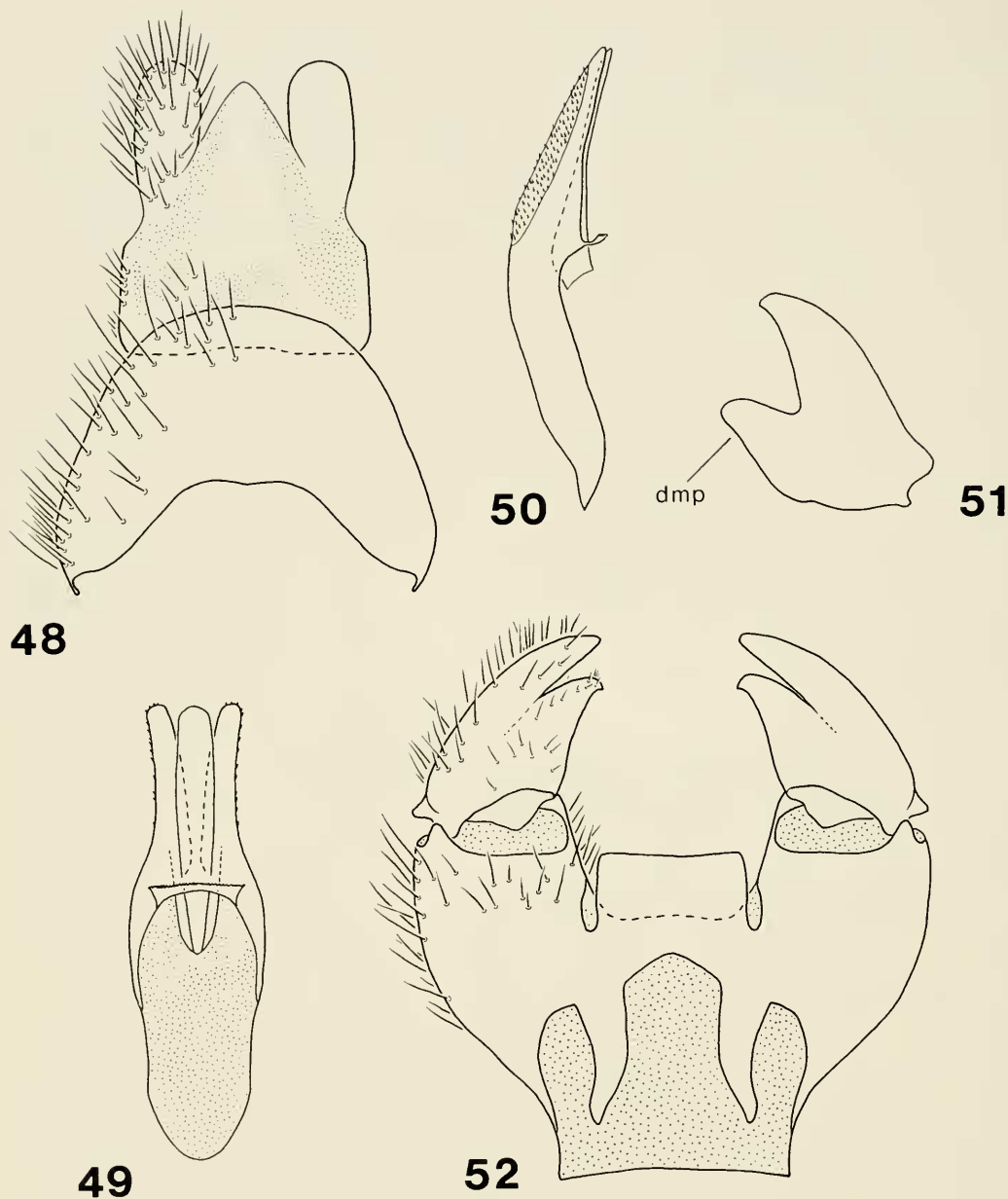
Figures 41–44. Male genitalia of *Beris strobli* Dušek and Rozkošný. 41. post-genital segments, dorsal view. 42. aedeagal complex, dorsal view. 43. aedeagal complex, lateral view. 44. genital capsule, dorsal view.



Figures 45–47. Female genital furcae of *Beris* spp., ventral views. 45. *B. fuscipes* Meigen. 46. *B. luteipes* Johnson. 47. *B. strobli* Dušek and Rozkošný.

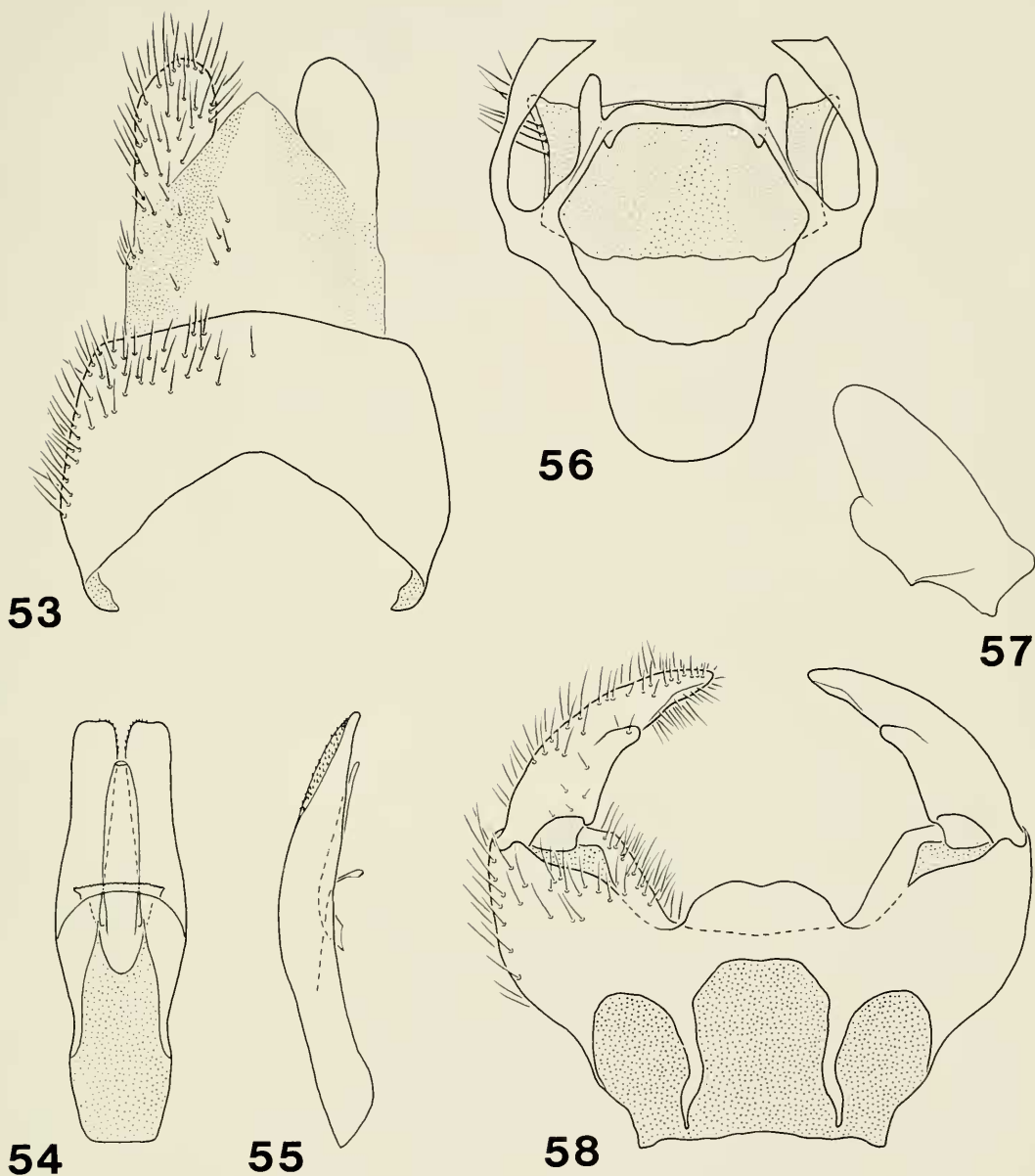
Abbreviation: sd, spermathecal duct.





Figures 48–52. Male genitalia of *Exodontha dubia* (Zetterstedt). 48. post-genital segments, dorsal view (note: stippling indicates membrane). 49. aedeagal complex, dorsal view; 50. aedeagal complex, lateral view. 51. gonostylus, dorso-lateral view. 52. genital capsule, dorsal view.

Abbreviation: dmp, dorsomedial process.



Figures 53–58. Male and female genitalia of *Exodontha luteipes* (Williston). 53. male post-genital segments, dorsal view (note: stippling indicates membrane). 54. male aedeagal complex, dorsal view. 55. male aedeagal complex, lateral view. 56. female genital furca, ventral view. 57. male gonostylus, dorsolateral view. 58. male genital capsule, dorsal view.